



SYLVA
SYLVARVM
OR,
A Naturall Historie.

IN TEN CENTVRIES.

WRITTEN BY THE RIGHT
Honourable FRANCIS LO. Verulam
Viscount S^r ALBAN.

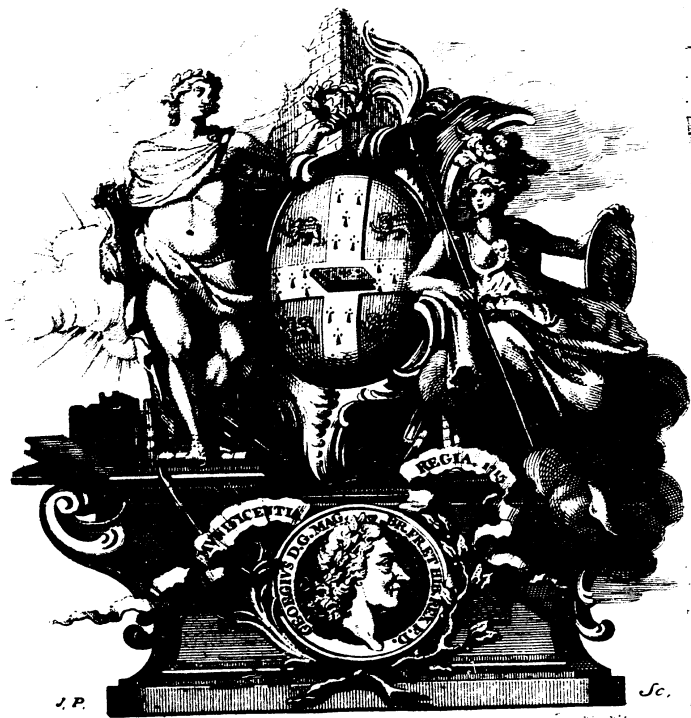
Published after the Authors death,
BY WILLIAM RAVVLEY Doctor in Divinity,
one of his Majesties Chaplaines.

Hereunto is now added an Alphabeticall Table of the prin-
cipall things contained in the whole Worke.

The fifth Edition.



L O N D O N
Printed by John Haviland, for William Lee, and
are to be sold at the Great Turkes Head next to the Mitre
Taverne in Fleetstreet. 1639.



TO THE MOST HIGH
AND MIGHTY PRINCE

CHARLES,

BY THE GRACE OF GOD,
King of Great Britaine, France, and
Ireland, Defender of the Faith, &c.

May it please your most Excellent Majestie ;

THe whole Body of the *Naturall History*, either designed or written, by the late *Lord Viscount S. Alban*, was dedicated to your *Majestie*, in his Booke *De Ventis*, about foure yeares past, when your *Majestie* was *Prince* : So as there needed no new Dedication of this *Worke*, but onely in all humbleness, to let your *Majestie* know, it is yours. It is true; if that *Lord* had lived, your *Majestie*, ere long, had beene invoked, to the Protection of another *History*; whereof, not *Natures Kingdome*, as in this, but these of your *Majesties*,
A 2 (during


The Epistle Dedicatory.

(during the Time and *Raigne* of King Henry the Eighth) had beene the Subject: Which since it died under the Designation meerely, there is nothing left, but your *Majesties* Princely Goodnesse, graciously to accept of the Undertakers Heart, and Intentions; who was willing to have parted, for a while, vvith his Darling *Philosophie*, that he might have attended your Royall Commandement, in that other *Worke*. Thus much I have beene bold, in all lowlinesse, to represent unto your *Majestie*, as one that vvvas trusted vvith his *Lordships* *Writings*, even to the last. And as this *Worke* affecteth the *Stampe* of your *Majesties* Royall *Protection*, to make it more currant to the *World*; So under the *Protection* of this *Worke*, I presume in all humblenessse to approach your *Majesties* presence; And to offer it up into your *Sacred Hands*.

Your *MAIESTIES* most Loyall
and Devoted Subject,

VV. RAVVLEY.

To the Reader.

AVING had the Honour to be continually with my Lord, in compiling of this *Worke*; And to be employed therein; I have thought it not amisse, (with his Lordships good leave and liking,) for the better satisfaction of those that shall reade it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say; that if he should have served the glory of his own Name, he had been better not to have published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have: But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himselfe. And he knew well, that there was no other vvay open, to unloose Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiving Notions, and Theories; and thereby made Impotent for Generation of Workes; But onely no where to depart from the Sense, and cleare experience; But to keepe close to it, especially in the beginning: Besides, this *Naturall History* was a Debt of his, being designed and set down for a third part of the *Instauration*. I have also heard his Lordship discourse, that Men (no doubt) will thinke many of the *Experiments* contained in this Collection, to be Vulgar and Triviall: Meane and Sordid; Curious and Fruitlesse: And therefore he wisheth, that they would have perpetually before their Eyes, what is now in doing: And the difference between this *Naturall Historie*, and others. For those *Naturall Histories*; which are Extant, Being gathered for De-

To the Reader.

light and Use, are full of pleasant Descriptions and Pictures; and affect and seeke after Admiracion, Rarities, and Secrets. But contrariwise, the Scope which his Lordship intendeth, isto write such a *Naturall Historie*, as may be Fundamentall to the Erecting and Building of a true *Philosophy*: For the Illumination of the *Understanding*; the Extracting of *Axiomes*; and the producing of many Noble *Workes*, and *Effects*. For he hopeth by this meanes, to acquit himselfe of that, for which he taketh *Himselfe* in a sort bound; And that is the Advancement of all Learning and Sciences. For having in this present Worke Collected the Materials for the Building; And in his *Novum Organum* (of which his Lordship is yet to publish a Second Part) set downe the Instruments and Directions for the Work; Men shall now bee wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall Men is capable. And in this behalfe, I have heard his Lo. speake complainingly; That his Lordship (who thinketh that he deserveth to be an Architect in this building) should be forced to be a Work-man, and a Labourer; And to digge the Clay, and burne the Brick; And more than that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will be done: Men are so set to despise the meanes of their owne good. And as for the *Basenesse* of many of the Experiments; As long as they be Gods Works, they are honourable enough. And for the *Vulgarnes* of them; true *Axiomes* must be drawne from plaine Experience, and not from doubtfull, And his Lordships course is to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewise must be broken and grinded, and not whole, or as it groweth. And for *Vse*; his Lordship hath often in his Mouth, the two kindes of Experiments; *Experimenta Frustrifera*, and *Experimenta Lucifera*: Experiments of *Vse*, and Experiments of *Light*: And he reporteth himselfe, whether he vvere not a strange Man, that should thinke that Light hath no Use, because it hath no Matter. Further his Lordship thought good also, to adde unto many of the Experiments themselves, some *Glosses* of the *Causes*; that in the succeeding vvorke of *Interpreting Nature*, and *Framing Axiomes*, all things may bee in more readinesse. And for the *Causes* herein by Him assigned; his Lordship persvadeeth Himselfe, they are farre more certaine, than those

To the Reader.

those that are rendred by Others; Not for any Excellency of his owne Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with *Nature*; and *Experience*. He did consider likewise, that by this addition of *Causes*, mens mindes (which make so much haste to finde out the *Causes* of things;) would not thinke themselves utterly lost, in a vast wood of *Experience*, but stay upon these *Causes*, (such as they are, a little, till true *Axiomes* may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact *Method*, (though he that looketh attentively into them, shall finde that they have a secret Order) was because he conceived that other men would now thinke that they could doe the like; And so go on with a further Collection: which if the *Method* had been Exact, many would have despaired to attaine by Imitation. As for his Lordships love of Order, I can referre any Man to his Lordships Latine Booke, *De Augmentis Scientiarum*; which (if my Judgement be any thing) is written in the Exactest Order, that I know any VVriting to be. I will conclude with an usuall speech of his Lordships. That this VVorke of his *Naturall Historie*, is the *World*, as GOD made it, and not as Men have made it; For that it hath nothing of Imagination.

W. Rawley.

This Epistle is the same, that should have beene prefixed to this Booke, if his Lordship had lived.

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NATU



NATVRALL HISTORIE.

I. Century.

Digge a Pit upon the Sea shore, somewhat above the High-
 water Marke, and sinke it as deepe as the Low-water
 Marke; And as the Tide commeth in, it will fill with
 water, Fresh and Potable. This is commonly practized
 upon the Coast of Barbary, where other fresh water is
 wanting. And Caesar knew this well, when he was be-
 sieged in Alexandria: For by digging of Pits in the
 Sea shore, hee did frustrate the Laborious Workes of the Enemies, which
 had turned the Sea-water upon the Wells of Alexandria; And so saved his
 Army, being then in Desperation. But Caesar mistooke the Cause, For hee
 thought that all Sea-Sands had Naturall Springs of Fresh water. But it is
 plaine, that it is the Sea-water; because the Pit filleth according to the
 Measure of the Tide: And the Sea-water passing or Straying through the
 Sands, leaveth the Saltnesse.

I remember to have Read, that Tryall hath beene made of Salt-water pas-
 sed through Earth; through Ten Vessels, one within another, and yet it hath
 not lost his Saltnesse, as to become potable: But the same Man saith, that
 (by the Relation of Another) Salt-water drayned through twenty Vessels,
 hath become Fresh. This Experiment seemeth to crosse that other of Pits,
 made by the Sea-side; and yet but in part; if it be true, that twenty Repetiti-
 ons doe the Effect. But it is worth the Note, how poore the Imitations of
 Nature are, in common course of Experiments, except they be led by great
 Judgement, and some good Light of Axiomes. For first, there is no small
 difference betweene a Passage of water through twenty small Vessels; And
 through such a distance, as betweene the Low-water and High-water Mark.
 Secondly, there is a great difference betweene Earth and Sand. For all Earth
 hath in it a kinde of Nitrous Salt, from which Sand is more free: And
 besides, Earth doth not straine the Water so finely, as Sand doth. But there
 is a third Point, that I suspect as much, or more than the other Two; And
 that is, that in the Experiment of Transmission of the Sea-water into the Pits,
 the water riseth; But in the Experiment of Transmission of the water through
 the Vessels, it falleth: Now certain it is, that the Salter Part of water, (once
 Salted

Experiment
 in Consort,
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Salted

Salted throughout) goeth to the Bottome. And therefore no marvaile, if the Drayning of *Water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike off the Salt part, than where the *Water* slideth of her owne Motion.

It seemeth *Perculation* or *Transmission*, (which is commonly called *Siraining*,) is a good kinde of *Separation*. Not onely of Thicke from Thin, and Grosse from Fine, But of more subtile Natures; And varieth according to the Body through which the *Transmission* is made. As if through a woollen Bagge, the Liquour leaveth the Fatnesse; If through Sand, the Saltnesse; &c. They speake of Severing Wine from Water, passing it through Ivy wood, or through other the like porous Body; But *Non constat*.

The Gumm of Trees (which we see to bee commonly shining and cleare) is but a fine Passage or *Siraining* of the Juyce of the Tree, through the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent than *Gumms*) are the fine Exudations of Stone.

Aristotle giveth the Cause, vainly, why the Feathers of Birds are of more lively Colours, than the Haires of Beasts; for no Beast hath any fine Azure, or Garnation, or Greene Haire. He saith, It is, because Birds are more in the Beames of the Sunne, than Beasts; but that is manifestly untrue; For Cause are more in the Sunne than Birds; that live commonly in the Woods, or in some Covert. The true Cause is, that the Excrementitious Moisture of living Creatures, which maketh as well the Feathers in Birds, as the Haire in Beasts, passeth in Birds through a finer and more delicate Strainer, than it doth in Beasts: For Feathers passe through Quills; And Haire through Skin.

The Clarifying of Liquors by Adhesion, is an Inward *Perculation*; And is effected, when some Cleaving Body is Mixed and Agitated with the Liquors, whereby the grosser Part of the Liquor sticks to that Cleaving Body; And so the finer Parts are freed from the Grosser. So the Apothecaries clarifie their *Sirrups* by whites of Eggs, beaten with the Juices which they would clarifie, which whites of Eggs gather all the Dregs and grosser Parts of the Juice to them; And after the *Sirrup* being set on the Fire, the whites of Eggs themselves harden, and are taken forth. So *Hippocrasse* is clarified by mixing with Milke; And stirring it about, And then passing it through a Woollen Bagge, which they call *Hippocrates Sleeve*; And the Cleaving Nature of the Milke draweth the Powder of the Spices, and grosser parts of the Liquor to it; and in the passage they stick upon the Woollen bagge.

The Clarifying of Water, is an Experiment tending to Health; besides the pleasure of the Eye, when Water is Chrystalline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the Water may straine through them.

It may be, *Perculation* doth not onely cause Clearenesse and Splendour, but Sweetnesse of Savour. For that also followeth, as well as Clearenesse, when the Finer Parts are severed from the Grosser. So it is found, that the Sweets of Men that have much Heat, and exercise much, and have cleane Bodies; and fine Skimmes, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gumms* have sweet Odours.

Take a Glasse, and put Water into it, and wet your Finger, and draw it round about the Lip of the Glasse, pressing it somewhat hard; And after you have drawne it some few times about, it will make the Water friske and

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Motion of Bodies
upon their
Pressure.

and sprinkle up, in a fine Dew. This Instance doth excellently Demonstrate the Force of *Compression* in a Solid Bodie. For whensoever a Solid Body (as Wood, Stone, Metall, &c.) is pressed, there is an inward Tumult in the parts thereof; seeking to deliver themselves from the *Compression*: And this is the Cause of all *Violent Motion*. Wherein it is strange in the highest Degree, that this *Motion* hath never beene observed, nor inquired; It being of all *Motions*, the most Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at first, by way of Proove, and Search, which way to deliver it selfe; And then worketh in Progresse, where it findeth the Deliverance easiest. In Liquors this *Motion* is visible: For all Liquors stricken make round Circles, and withall Dash; but in Solids, (which breake not,) it is so subtile, as it is invisible; but nevertheless bewrayeth it selfe by many effects; as in this Instance whereof we speake. For the Pressure of the Finger furthered by the wetting (because it sticketh so much the better unto the Lip of the Glasse,) after some continuance, putteth all the small Parts of the Glasse into worke; that they strike the Water sharply; from which *Percussion* that Sprinkling commeth.

If you strike or pierce a Solid Body, that is Brittle, as Glasse, or Sugar, it breaketh not onely; where the immediate force is; but breaketh all about into shivers and fitters. The Motion, upon the Pressure, searching all wayes; and breaking where it findeth the Body weakest.

The Powder in Shot, being Dilated into such a Flame, as endureth not *compression*; Moveth likewise in round, (The Flame being in the Nature of a liquid Body;) Sometimes recoyling; Sometimes breaking the Piece; But generally discharging the Bullet, because there it findeth easiest Deliverance.

This Motion upon Pressure, and the Reciprocall thereof, which is Motion upon Tensure; wee use to call (by one common Name) Motion of *Libertie*; which is, when any Body, being forced to a *Preter-Naturall* Extent, or Dimension, delivereth and restoreth it selfe to the Naturall: As when a Blowne Bladder (Pressed) riseth againe; or when Leather or Cloth tentured spring backe. These two Motions (of which there bee infinite Instances,) we shall handle in due place.

This Motion upon Pressure is excellently also demonstrated in Sounds. As when one Chimeth upon a Bell, it foundeth; But as soone as he layeth his hand upon it, the Sound ceaseth: And so, the Sound of a *Virginall String*, as soone as the Quill of the Jack falleth from it, stoppeth. For these Sounds are produced, by the subtile *Percussion* of the Minute parts, of the Bell, or String, upon the Aire; All one, as the Water is caused to leape by the subtile *Percussion* of the Minute parts of the Glasse, upon the Water, whereof we spake a little before in the ninth Experiment. For you must not take it to be, the locall Shaking of the Bell, or String, that doth it. As wee shall fully declare, when we come hereafter to handle Sounds.

Take a Glasse with a Belly and a long Neck; fill the Belly (in part) with Water: Take also another Glasse, whereinto put Claret Wine and Water mingled; Reverse the first Glasse, with the Belly upwards, Stopping the Neck with your finger; Then dip the Mouth of it within the Second Glasse, and remove your Finger: Continue it in that posture for a time; And it will unminge the Wine from the Water: The Wine ascending and settling in the top of the upper Glasse; And the Water descending and settling in the bottome of the lower Glasse. The passage is apparent to the Eye; For

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in Confort
touching
Separations of
Bodies by
weights.

you shall see the *Wine*, as it were, in a small veine, rising through the *Water*. For handfomnesse sake (because the Working requireth some small time) it were good you hang the upper *Glasse* upon a Naile. But as soone as there is gathered so much pure and unmixed *water* in the Bottom of the Lower *Glasse*, as that the Mouth of the upper *Glasse* dippeth into it, the *Motion* ceaseth.

Let the Upper *Glasse* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Upper *Glasse* be *Water* pure, the Lower *Water* coloured; or contrariwise; there followeth no *Motion* at all. But it hath been tryed, that though the Mixture of *Wine* and *Water*, in the Lower *Glasse*, bee three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This Separation of *Water* and *Wine* appeareth to bee made by *Weight*; for it must be of Bodies of unequall *Weight*; or else it worketh not; And the Heavier Body must ever bee in the upper *Glasse*. But then note withall, that the *Water* being made penfible, and there being a great *Weight* of *Water* in the Belly of the *Glasse*, sustained by a small Pillar of *Water* in the Neck of the *Glasse*; It is that, which setteth the *Motion* on worke: For *Water* and *Wine* in one *Glasse*, with long standing, will hardly sever.

This Experiment would be Extended from Mixtures of severall *Liquours*, to *Simple Bodies*, which Consist of severall Similare Parts: Try it therefore with *Broyne* or *Salt water*, and *Fresh water*: Placing the *Salt water* (which is the heavier) in the upper *Glasse*; And see whether the *Fresh* will come above. Try it also with *Water* thick Sugred, and *Pure water*; and see whether the *water* which commeth above, will lose his Sweetnesse: For which purpose it were good there were a little Cock made in the Belly of the upper *Glasse*.

Experiments
in Consort
touching Indi-
cations and Accu-
rate Infusions,
both in Li-
quours, and Aire.

IN Bodies containing Fine Spirits, which doe easily dissipate, when you make *Infusions*, the Rule is; A short Stay of the Body in the *Liquour* receiveth the Spirit; And a longer Stay confoundeth it; because it draweth forth the Earthy Part withall; which embaseth the finer. And therefore it is an Error in *Physicians*, to rest simply upon the Length of stay, for increasing the vertue. But if you will have the *Infusion* strong, in those kind of Bodies, which have fine Spirits, your way is, not to give Longer time, but to repeat the *Infusion* of the Body oftner. Take *Violets*, and infuse a good Pugill of them in a Quart of Vineger; Let them stay three quarters of an houre, and take them forth; And refresh the *Infusion* with like quantity of new *Violets*, seven times; And it will make a Vineger so fresh of the Flower, as if a Twelve-moneth after, it be brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the Flower, a good while after, than at first.

This Rule, which we have given, is of singular use, for the Preparations of *Medicines*, and other *Infusions*. As for Example; the Lease of *Burrage* hath an Excellent Spirit, to repress the fuliginous Vapour of Dusky Melancholy, and so to cure Madnesse: But neverthelesse, if the Lease bee infused long, it yeeldeth forth but a raw substance, of no Vertue: Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it bee Tunned, the *Burrage* stay a small time, and bee often changed with fresh; It will make a Sovereigne Drinke for Melancholy Passions. And the like I conceive of *Orange Flowers*.

Rubarb hath manifestly in it Parts of contrary Operations: Parts that purge; And parts that binde the body: And the first lay looser, and the latter lay deeper:

de. per: So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and binde the Body lesse after the purging, than if it stood twenty foure houres; This is tryed: But I conceive likewise, that by Repeating the *Infusion* of *Rubarb*, severall times, (as was said of *Violets*;) letting each stay in but a small time; you may make it as strong a *Purging Medicine*, as *Scammony*. And it is not a small thing wonne in *Physick*, if you can make *Rubarb*, and other *Medicines* that are *Benedict*, as strong Purgers, as those that are not without some Maliginity.

Purging Medicines, for the most part, have their *Purgative* Vertue, in a fine Spirit; As appeareth by that they endure not boyling, without much losse of vertue. And therefore it is of good use in *Physick*, if you can retaine the *Purging* Vertue, and take away the Unpleasant taste of the *Purger*; which it is like you may doe, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Taste, is in the Groffer part.

Generally, the working by *Infusions*, is grosse and blinde, except you first trie the Issuing of the severall Parts of the Bodie, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leave that Quality, which you desire. This to know, there be two wayes; The one to trie what long stay, and what short stay worketh, as hath beene said: The other to trie in Order, the succeeding *Infusions*, of one and the same Bodie, successively, in severall *Liquours*. As for example; Take *Orange-Pils*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them Infuse halfe an houre in *Water*: Then take them out; and Infuse them againe in other *Water*; And so the third time; And then taste and consider the first *Water*, the Second, and the Third: And you will find them differing, not only in Strength and Weaknesse, but otherwise in Taste, or Odour; For it may be the First *water* will have more of the Sent, as more Fragrant; And the Second more of the Taste, as more bitter or Biting, &c.

Infusions in Aire, (for so we may well call *Odours*) have the same diversities with *Infusions* in *Water*; In that the severall *Odours* (which are in one Flower, or other Body) issue at severall times; Some earlier, some later: So wee finde that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleasing Sent, that commeth forth first; But soone after an ill Sent quite differing from the Former. Which is caused, not so much by Mellowing, as by the late Issuing of the Groffer Spirit.

As we may desire to extract the finest Spirits in some Cases, So we may desire also to discharge them (as hurtfull) in some other. So *Wine burne*, by reason of the Evaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseeth some of his poysonous Qualitie, if it be vapoured out, mingled with Spirit of *Wine*, or the like: *Sean* leeseeth somewhat of his windiness by Decocting; And (generally) subtiler or windy Spirits are taken off by Incension, or Evaporation. And even in *Infusions* in things that are of too high a Spirit, you were better powre off the first *Infusion*, after a small time, and use the latter.

Bubbles are in the forme of an Hemisphere; Aire within, and a little Skin of *Water* without: And it seemeth somewhat strange, that the Aire should rise so swiftly, while it is in the *Water*; And when it commeth to the top, should be stayed by so weak a Cover as that of the Bubble is. But as for the swift Ascent of the Aire, while it is under the *Water*, that is a Motion of Percussion from the *Water*; which it selfe descending, driveth up the Aire; and no Motion of Levity in the Aire. And this *Democritus* called

Experiment
Solitary touch-
ing the App-
etite of Conti-
nuation in
Liquids.

called *Motus Plage*. In this Common Experiment, the Cause of the Enclosure of the *Bubble* is, for that the Appetite to resist Separation, or Discontinuance, (which in solide *Bodies* is strong) is also in *Liquours*, though fainter and weaker; As wee see in this of the *Bubble*: we see it also in little Glasses of Spittle that children make of Rushes; And in Castles of Bubbles, which they make by blowing into water, having obtained a little Degree of Tenacity by Mixture of Soape: Wee see it also in the *Stillicides* of water, which if there be water enough to follow, will Draw themselves into a small thred, because they will not discontinue, But if there be no Remedy, then they cast themselves into round Drops; which is the Figure, that saveth the Body most from Discontinuance: The same Reason is of the Roundnesse of the *Bubble*, as well for the Skin of water, as for the *Aire* within: For the *Aire* likewise avoideth Discontinuance; And therefore casteth it selfe into a round Figure. And for the stopp and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Appetite, of Ascending.

Experiment
Solitary touch-
ing the mark-
ing of Artifi-
ciall Springs.

25

THE Rejection, which I continually use, of Experiments, (though it appeareth not) is infinite; But yet if an Experiment be probable in the Worke, and of great Use, I receive it, but deliver it as doubtfull. It was reported by a Sober Man, that an Artificiall Spring may be made thus: Finde out a hanging Ground, where there is a good quick Fall of Rain-water. Lay a Halfe-Trough of Stone, of a good length, three or four foot deepe within the same Ground, with one end upon the high Ground, the other upon the low. Cover the Trough with Brakes a good thicknesse, and cast Sand upon the Top of the Brakes: You shall see, (saith hee) that after some showres are past, the lower end of the Trough will runne like a Spring of water: which is no marvaile, if it hold, while the Raine-water lasteth, But hee said it would continue long time after the Raine is past: As if the water did multiply it selfe upon the *Aire*, by the helpe of the Coldnesse and Condensation of the Earth, and the Consort of the first Water.

Experiment
Solitary touch-
ing the Ve-
nomous Quality
of Mans Flesh.

26

THE French, (which put off the Name of the French Disease, unto the Name of the Disease of Naples,) doe report, that at the Siege of Naples, there were certaine wicked Merchants that Barrellled up Mans flesh, (of some that had been lately slain in Barbary) and sold it for Tunney; And that upon that foule and high Nourishment, was the Originall of that Disease. Which may well bee, For that it is certaine, that the *Caniballs* in the West Indies, eat Mans flesh; And the West Indies were full of the Pocks when they were first discovered: And at this day the Mortalest poisons, practised by the West Indians, have some Mixture of the Bloud, or Fat, or Flesh of Man: And divers Witches, and Sorceresses, as well amongst the Heathen, as amongst the Christians, have fed upon Mans flesh, to aid (as it seemeth) their Imagination, with high and foule Vapours.

Experiment
Solitary touch-
ing the Pen-
etration and Trans-
mutation of
Aire into
water.

27

IT seemeth that there bee these wayes (in likelihood) of Version of Vapours or *Aire*, into Water and Moisture. The first is Cold; which doth manifestly Condense; as wee see in the Contracting of the *Aire* in the Weather-Glasse; whereby it is a Degree nearer to Water. Wee see it also in the Generation of Springs, which the Ancients thought (very probably) to be made by the Version of *Aire* into water, holpen by the Rest, which the *Aire* hath in those Parts, whereby it cannot dissipate. And by the Coldnesse of Rocks; for there

there Springs are chiefly generated. Wee see it also in the Effects of the Cold of the Middle Region (as they call it) of the *Aire*; which produceth Dews, and Raines. And the Experiment of Turning water into Ice, by Snow, Nitre, and Salt, (whereof we shall speak hereafter,) would be transferred to the Turning of *Aire* into Water. The Second way is by Compression; As in Stillatories, where the Vapour is turned back, upon it selfe, by the Encounter of the Sides of the Stillatory; And in the Dew upon the Covers of Boiling Pots. And in the Dew towards Raine, upon Marble, and wainscots. But this is like to doe no great effect; Except it be upon Vapours, and grosse *Aire*, that are already very neare in Degree to Water. The Third is that, which may bee searched into, but doth not yet appeare, which is, by Mingling of moist Vapours with *Aire*; And trying if they will not bring a Returne of more water, than the water was at first: For if so, That Increase is a Version of the *Aire*: Therefore put water into the Bottom of a Stillatory, with the Neb stopped; Weigh the water first; Hang in the Middle of the Stillatory a large Sponge; And see what Quantity of water you can crush out of it; And what it is more, or lesse, compared with the water spent; For you must understand, that if any Version can be wrought, it will be easiest done in small Pores: And that is the Reason why we prescribe a Sponge. The Fourth way is Probable also, though not Appearing; Which is, by Receiving the *Aire* into the small Pores of Bodies; For (as hath bene said) every thing in small Quantity is more easie for version; And Tangible Bodies have no pleasure in the comfort of *Aire*, but endeavour to subact it into a more Dense Body: But in Entire Bodies it is checked; because if the *Aire* should Condense, there is nothing to succeed: Therefore it must be in loose Bodies, as Sand, and Powder; which we see, if they lie close, of themselves gather Moisture.

IT is reported by some of the Ancients; That Whelps, or other Creatures, if they be put Young, into such a Cage, or Box, as they cannot rise to their Stature, but may increase in Breadth, or length, will grow accordingly, as they can get Roome: which if it be true, and faisible, and that the young Creature so pressed, and straightened, doth not thereupon die: It is a Meanes to produce Dwarfed Creatures, and in a very Strange figure. This is certaine, and noted long since; That the Pressure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macrocephali*; which shape of the Head, at that time, was esteemed. And the Railing gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which observation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kindes, more comely, and better featured, than otherwise they would bee; By the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Legges, to keep them from falling down too low; And by Stroaking up the Forehead to keep them from being low-foreheaded. And it is a common Practice to swathe Infants; that they may grow more straight, and better shaped: And we see Young Women, by wearing straight Bodies, keepe themselves from being Grosse and Corpulent.

ONions, as they hang, will many of them shoot forth; and so will Pennivertiall; and so will an Herbe called *Orpin*; with which they use, in the Countrey, to trimme their Houses, binding it to a Lath, or Stick, and setting it against a wall. Wee see it likewise, more especially, in the greater

Experiment
Solitary touch-
ing the
Beauty and good
Features of
Persons.

28

Experiment
Solitary touch-
ing the Con-
densing of Aire
in such sort as
it may put on
weight, and
yeild Nourish-
ment.

29

Semper-

Semper-vive, which will put out Branches, two or three yeares: But it is true, that commonly they wrap the Root in a Cloth besmeared with Oyle, and renew it once in halfe a Yeare. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is; For that these *Plants* have a Strong, Dense, and Succulent Moisture, which is not apt to exhale; And so is able, from the old store, without drawing helpe from the Earth, to suffice the sprouting of the *Plants*: And this Sprouting is chiefly in the late Spring, or early Sommer, which are the Times of Putting forth. Wee see also, that *Stumps of Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to try whether these things, in the Sprouting, doe increase *Weight*; which must be tryed, by weighing them before they be hang'd up; And afterwards againe, when they are sprouted. For if they increase not in *Weight*; Then it is no more but this; That what they send forth in the Sprout, they leese in some other Part: But if they gather *Weight*, then it is *Magnale Nature*; For it sheweth that *Aire* may be made so to be Condensed, as to be converted into a *Dense Body*; whereas the Race and Period of all things, here above the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also, that *Aire* can *Nourish*, which is another great Matter of Consequence. Note, that to triethis, the *Experiment* of the *Semper-vive*, must be made without Oyling the Cloth; For else, it may bee, the *Plants* receiveth Nourishment from the Oyle.

Experiment
Solitary touch-
ing the Com-
mixture of
Flame and
Aire, and the
great Force
thereof.

30

Flame and Aire do not Mingle, except it be in an *Instant*; Or in the *viscous Spiritus of vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath beene ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus farre it is true: And then (forsooth) it is become another Element; the Forme whereof occupieth more place; And so, of Necessitie, followeth a Dilatation: And therefore, lest two Bodies should bee in one place, there must needs also follow an Expulsion of the Pellet; Or blowing up of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing else, except it were in very great quantity, will be suffocate with any hard Body, such as a Pellet is; Or the Barrell of a Gunn; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the Cause of this so potent a Motion, is the *Nitre*, (which we call otherwise *Salt-Petre*;) which having in it a notable Crude and windy *Spirit*, first by the Heat of the Fire suddenly dilateth it selfe; (And we know that simple *Aire*, being preternaturally attenuated by Heat, will make it selfe Roome, and breake, and blow up that which resisteth it;) And Secondly, when the *Nitre* hath dilated it selfe, it bloweth abroad the *Flame*, as an inward Bellows. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *Wilde-Fire*, & divers other Inflammable Matters, though they burne cruelly, and are hard to quench. Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, we see that *Quick-Silver*, (which is a most Crude and Watry Body) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certaine, their *viscous Spiritus* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle, yet bound in by a Body that hath some fixing, they will. For that you may best see in those two Bodies; (which are their *Aliments*;) *Water*, and *Oyle*; For they likewise will not well mingle of themselves, but in the Bodies of *Plants*, and

and *Living Creatures*, they will. It is no marvaile therefore, that a small Quantity of *Spiritus*, in the Cels of the Braine, and Cannals of the Sinewes, are able to move the whole Body, (which is of so great Masse,) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnesse, as in playing Division upon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame*, when they incorporate.

Take a small *Wax Candle*, and put it in a Socket, of Brasse, or Iron; Then set it upright in a Porringer full of *Spirit of wine*, heated: Then set both the *Candle*, and *Spirit of wine*, on fire, and you shall see the *Flame* of the *Candle*, open it selfe, and become foure or five times bigger than otherwise it would have beene; and appeare in Figure *Globular*, and not in *Piramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blew towards the Colour of the Outward flame of the *Spirit of wine*. This is a Noble Instance; wherein two things are most remarkable; The one, that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the Sides: And the greater the *Flame* is at the Bottom, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but onely remaineth contiguous; As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a *Piramis* in *Flame*, which we usually see, is meerely by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would be Round: And therefore *Smoake* is in the Figure of a *Piramis* Reversed; For the *Aire* quencheth the *Flame*, and receiveth the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of wine*, is troubled; And doth not only open and move upwards, but moveth waving, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as move upwards. By all which it should seeme, that the Celestiall Bodies, (most of them,) are true *Fires* or *Flames*, as the *Sticks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all *Globular*, and Determinate; They have Rotation; And they have the Colour and Splendour of *Flame*: So that *Flame* above is Durable, and Consistent, and in his Naturall place; But with us, it is a Stranger, and Momentary, and Impure; Like *Vulcan* that halted with his Fall.

Take an *Arrow*, and hold it in *Flame*, for the space of ten pulses, And when it commeth forth, you shall finde those Parts of the *Arrow*, which were on the Outsides of the *Flame*, more burned, blacked, and turned almost into a Coale; whereas that in the Middest of the *Flame*, will be, as if the Fire had scarce touched it. This is an Instance of great consequence for the discovery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the Sides, than in the Middest: And, which is more, that Heat or Fire is not violent or furious, but where it is checked and pent. And therefore the *Peripateticks* (howsoever their opinion of an Element of Fire above the *Aire* is justly exploded;) in that Point they acquit themselves well: For being opposed, that if there were a *Sphere* of Fire, that incompassed the Earth so neare hand, it were impossible but all things should be burnt up; They answer, that the pure Elementall Fire, in his owne place, and not irritate, is but of a Moderate Heat.

It

Experiment
Solitary touch-
ing the Se-
cret Nature of
Flame.

31

Experiment
Solitary touch-
ing the Dif-
ferent force of
Flame in the
Middest and on
the Sides.

32

Experiment
Solitary tou-
ching the De-
crease of the
Natural motion
of Gravity in
great distance
from the Earth;
or within some
depth of the
Earth.

33

It is affirmed constantly by many, as an usuall Experiment; That a *Lump of Ice*, in the *Bosome of a Mine*, will be tumbled, and started, by two Mens strength; which if you bring it to the *Top of the Earib*, will aske Six Mens strength at the least to stime it. It is a Noble Instance, and is fit to be tryed to the full: For it is very probable, that the *Motion of Gravitie* worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Union of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the *Moving to a Point or Place* (which was the Opinion of the *Ancient*) it is a mere Vanity.

Experiment
Solitary tou-
ching the Con-
traction of U-
dies in Bulk, by
the Mixture of
the more Li-
quid Body with
the more Solid

34

It is strange, how the *Ancients* tooke up Experiments upon credit, and yet did build great Matters upon them. The Observation of some of the best of them, delivered confidently is, That a *Vessel* filled with *Asbes*, will receive the like quantity of *Water*, that it would have done, if it had beene empty. But this is utterly untrue, for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Asbes*; As we see that *Asbes* alone, if they be hard pressed, will lie in lesse room: And so the *Asbes* with *Aire* between, lie looser; and with *Water*, closer. For I have not yet found certainly, that the *Water*, it selfe, by mixture of *Asbes*, or *Dust*, will shrinke or draw into lesse Room.

Experiment
Solitary tou-
ching the Ma-
king Vines
more fruitful.

35

It is reported of credit, that if you lay good store of *Kernels of Grapes*, about the *Root of a Vine*; it will make the *Vine* come earlier and prosper better. It may be tryed with other *Kernels*, laid about the *Root of a Plant* of the same kinde, As *Figs*, *Kernels of Apples*, &c. The Cause may be, for that the *Kernels* draw out of the Earth Juice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robt eth and devoureth the Nourishment, when they have drawne it: As great *Fishes* devoure little.

Experiments
in Comfort
touching Pur-
ging Medicines.

36

The Operation of *Purging Medicines*, and the Causes thereof, have beene thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Quality*, & the like Shifts of Ignorance. The Causes of *Purging* are divers; all plain and perspicuous, and thoroughly maintained by Experience. The first is, That what soever cannot be overcome and digested by the *Stomack*, is by the *Stomack*, either put up by *Vomit*, or put down to the *Guts*; And by that *Motion of Expulsion* in the *Stomack*, & *Guts*, other *Parts of the Body*, (as the *Orifices of the Veins*, & the like) are moved to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomack*, is caused either by the *Quality* of the *Medicine*, or by the *Quantity*. The *Qualities* are three: *Extreme Bitter*, as in *Aloes*, *Coloquintida*, &c. Loathsome and of horrible taste, As in *Agarick*, *Black Hellebore*, &c. And of secret *Malignity*, & disagreement towards *Mans Body*, many times not appearing much in the *Taste*; As in *Scammony*, *Melchoachan*, *Antimony*, &c. And note well, that if there be any *Medicine* that *Purge*, and hath neither of the first two *Manifest Qualities*, it is to bee held suspected, as a kinde of *Poyson*; For that it worketh either by *Corrosion*, or by a secret *Malignity*, and Enmity to Nature: And therefore such *Medicines* are warily to be prepared, and used. The *Quantity* of that which is taken, doth also cause *Purging*; As we see in a great *Quantity* of *New M. lke* from the *Cow*; yea and a great *Quantity* of *Meat*; For

Surfets

Surfets many times turne to *Purges*, both upwards, and downwards. Therefore we see generally, that the working of *Purging Medicines* commeth two or three houres after the *Medicines* taken; For that the *Stomack* first maketh a prooffe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantity*.

A second Cause is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seene, that *Salt*, or any such thing, that is sharp and biting, put into the *Fundament*, doth provoke the Part to expell; And *Mustard* provoketh Sneezing: And any sharp Thing to the *Eyes* provoketh Teares. And therefore we see that almost all *Purgers* have a kinde of *Twiching* and *vellication*, besides the *Griping* which commeth of winde. And if this *mordication* be in an over-high Degree, it is little better than the *Corrosion* of *Poyson*; And it commeth to passe sometimes in *Antimony*; Especially if it be given to bodies not repleat with Humours; for where Humours abound, the Humours save the Parts.

The third Cause is *Attraction*: For I doe not deny, but that *Purging Medicines* have in them a direct Force of *Attraction*; As *Drawing Plasters* have in *Surgery*: And wee see *Sage*, or *Beitony bruised*, *Sneezing-powder*, and other *Powders* or *Liquours* (which the *Physicians* call *Errhines*;) put into the *Nose*, draw *Flegme*, and water from the *Head*; And so it is in *Apoplegmatismes*, and *Gargarismes*, that draw the *Rheume* downe by the *Pallat*. And by this *Vertue*, no doubt, some *Purgers* draw more one Humour, and some another, according to the opinion received: As *Rubarb* draweth *Choller*; *Sean* *Melancholy*; *Agarick* *Flegme*; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides *Sympathy*, between the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* worke quicker than others: And they that draw quick, draw onely the *Lighter*, and more fluide Humours; they that draw slow, worke upon the more *Tough*, and *Viscous* Humours. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the *Lightest* part of the Humour away, and leaveth the *Mass* of Humours more obstinate. And the like may be said of *Worme-wood*, which is so much magnified.

The fourth Cause is *Flatusitie*; For wine stirred moveth to expell: And wee findethat (in effect) all *Purgers* have in them a raw *Spirit*, or *Winde*; which is the *Principall Cause* of *Tortion* in the *Stomack* and *Belly*. And therefore *Purgers* leefe (most of them) the vertue, by *Decoction* upon the *Fire*; And for that Cause are given chiefly in *Infusion*, *Juyce*, or *Powder*.

The fift Cause is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *Sponge*: So wee see that *Taking Cold* moveth loosenesse by *Contraction* of the skin, and outward Parts; And so doth *Cold* likewise cause *Rheumes*, and *Defluxions* from the *Head*; And some *Astringent Plasters* crush out purulent Matter. This kinde of Operation is not found in many *Medicines*: *Mirabolanes* have it; And it may be the *Barkes of Peaches*; For this *Vertue* requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the *Body*; (For a pleasing *Astriction* doth rather *Binde* in the Humours, than *Expell* them;) And therefore such *Astriction* is found in Things of an *Harsh Taste*.

The Sixth Cause is *Lubrefaction*, and *Relaxation*. As wee see in *Medicines Emolliens*; Such as are *Milke*, *Honey*, *Mallows*, *Lettuce*, *Mercuriall*, *Pellitory of the Wall*, and others. There is also a secret *Vertue of Relaxation* in *Cold*: For the *Heat* of the *Body* bindeth the *Parts* and *Humours* together, which

Cold,

Cold, relaxe:h: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, *Breake*, and dissolve. And by this kinde of *Relaxation*, *Fear*e looseth the *Belly*, because the *Heat* retiring inwards towards the *Heart*, the *Gutts* and other *Parts* are relaxed; In the same manner as *Fear*e also causeth Trembling in the *Sinewes*. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42

The Seventh Cause is *Absterision*, which is plainly a *Scouring off*, or *Incision* of the *more viscidum Humours*, and making the *Humours* more fluide; And Cutting betwene them, and the *Part*. As is found in *Nitrous Water*, which scoureth *Linnen Cloth* (speedily) from the *Foulenesse*. But this *Incision* must bee by a *Sharpnesse*, without *Astition*: Which we finde in *Salt*, *Yew-wood*, *Oxymel*, and the like.

43

There be *Medicines*, that move *Stooles*, and not *Vrine*; Some other *Vrine*, and not *Stooles*. (Those that *Purge* by *Stoole*, are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomach*, and therefore move immediately downwards to the *Gutts*; Or else are afterwards rejected by the *Mesentery Veines* and so turne likewise downwards to the *Gutts*; and of these two kinds are most *Purgers*. But those that move *Vrine*, are such as are well digested of the *Stomach*, and well received also of the *Mesentery Veines*; So they come as farre as the *Liver*, which sendeth *Vrine* to the *Bladder*, as the *Whey* of *Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liver*, in sending downe the wheyey Part of the *Bloud* to the *Reines*. For *Medicines* *Vrinative* doe not worke by Rejection, and Indigestion, as *Solutive* doe.

44

There bee divers *Medicines*, which in greater *Quantity*, move *Stoole*; and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantity*, move *Vrine*, and in smaller, *Stoole*. Of the former sort is *Rubarb*, and some others. The Cause is, for that *Rubarb* is a *Medicine*, which the *Stomacke* in a small *Quantity* doth digest and overcome, (being not *Flatuous*, nor *Loathsome*), and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater *Quantity*, the *Stomacke* cannot overcome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to bee of the second sort; which being in small *Quantity*, moveth winde in the *Stomack* and *Gutts*, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *Wind*. And it selfe getteth to the *Mesentery veines*; And so to the *Liver*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Experiments
in Confort
touching
Meats and
Drinks that are
most Nourishing

45

WE have spoken of *Evacuating* of the *Body*, we will now speake something of the *Filling* of it by *Restorative*s in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one *Part* that is more *Nourishing* than another; As *Graines*, and *Roots* nourish more, than the *Leaves*; in so much as the *Order* of the *Foliolanes* was put downe by the *Pope*, as finding *Leaves* unable to *Nourish* Mans *Bodie*. Whether there bee that difference in the *Flesh* of *Living Creatures*, is not well inquired: As whether *Livers*, and other *Emails*, be not more *Nourishing*, than the *Outward Flesh*. We finde that amongst the *Romans*, a *Gooses Liver* was a great *Delicacy*. In so much as they had *Artificiall Means* to make it faire, and great; But whether it were more *Nourishing*, appeareth not. It is certaine, that *Marrow* is more *Nourishing*, than *Fat*. And I conceive that some *Decoction* of *Bones*, and *Sinewes*, stamped, and well strained, would be a very *Nourishing Broth*: Wee finde also that *Scotch Skinke*, (which is a *Pottage* of strong *Nourishment*), is made

made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Telley* also, which they use for a *Restorative*, is chiefly made of *Knuckles* of *Veale*. The *Pulp* that is within the *Crawfish* or *Crab*, which they spice and butter, is more *Nourishing* than the *Flesh* of the *Crab*, or *Crawfish*. The *Yolkes* of *Egges* are clearly more *Nourishing* than the *Whites*. So that it should seeme, that the *Parts* of *Living Creatures*, that lie more *Inwards*, nourish more than the *Outward Flesh*: Except it be the *Braine*; which the *Spirits* prey too much upon, to leave it any great *Vertue* of *Nourishing*. It seemeth for the *Nourishing* of *Aged Men*, or *Men* in *Consumptions*, some such thing should be *Devised*, as should be halfe *Chylus*, before it be put into the *Stomach*.

46

Take two large *Capons*; perboyle them upon a soft fire, by the space of an houre, or more, till in effect all the *Bloud* be gone. Adde in the *Decoction* the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shankes*, and throw them away. Then with a good strong *Chopping-knife*, mince the two *Capons*, bones and all, as small as ordinary *Minced Meat*; Put them into a large neat *Boulter*; Then take a *Kilderkin*, sweet, and well seasoned, of foure Gallons of *Beere*, of 8. s. strength, new as it commeth from the *Tunning*; Make in the *Kilderkin* a great *Bung-hole* of purpose: Then thrust into it, the *Boulter* (in which the *Capons* are) drawne out in length; Let it steepe in it three *Dayes*, and three *Nights*, the *Bung-hole* open, to worke; Then close the *Bung-hole*, and so let it continue, a *Day* and an halfe; Then draw it into bottles, and you may drink it well after 3 *dayes* Botteling; And it will last 6 weekes (approved.) It drinketh fresh, flowreth and mantleth exceedingly; It drinketh not newish at all; It is an excellent *Drinke* for a *Consumption*, to be drunke either alone, or Carded with some other *Beere*. It quencheth *Thirst*, and hath no whit of windiness. Note, that it is not possible, that *Meat* and *Bread*, either in *Broths*, or taken with *Drink*, as is used, should get forth into the *veins*, and *outward Parts*, so finely, and easily, as when it is thus *Incorporate*, and made almost a *Chylus* aforehand.

47

Triall would bee made of the like *Brew* with *Potado Roots*, or *Burr Roots*, or the *Pish* of *Artichokes*, which are *nourishing Meats*: It may be tryed also, with other *flesh*; As *Pheasant*, *Partridge*, *Young Porke*, *Pigge*, *Venison*, especially of young *Deere*, &c.

48

A *Mortresse* made with the *Browne* of *Capons*, stamped, and strained, and mingled (after it is made) with like *quantity*, (at the least,) of *Almond Butter*; is an excellent *Meat* to nourish thole that are weake; Better than *Blanck-Manger*, or *Telley*: And so is the *Cullice* of *Cockes*, boyled thick with the like *Mixture* of *Almond Butter*: For the *Mortresse*, or *Cullice*, of it selfe, is more *Savory* and strong; And not so fit for *Nourishing* of weake *Bodies*; But the *Almonds* that are not of so high a taste as *Flesh*, doe excellently qualifye it.

49

Indian Maiz hath (of certaine,) an excellent *Spirit* of *Nourishment*; But it must be thoroughly boyled, and made into a *Maiz-Cream* like a *Barley-Cream*. I judge the same of *Rize*, made into a *Cream*; For *Rize* is in *Turky*, and other *Countries* of the *East*, most fed upon; But it must be thoroughly boiled in respect of the *Hardnesse* of it: And also because otherwise it bindeth the *body* too much.

50

Pistachoes, so they be good, and not musty, joyned with *Almonds* in *Almond Milke*; Or made into a *Milk* of themselves, like unto *Almond Milke*, but more *greene*, are an excellent *Nourisher*. But you shall doe well, to adde a little *Ginger*, scraped, because they are not without some subtil windiness.

C

Milke

51

Milke warme from the Cow, is found to be a great Nourisher, and a good Remedy in *Consumptions*: But then you must put into it, when you *Milke* the Cow, two little bagges; the one of *Powder of Mint*, the other of *Powder of Red Roses*; For they keepe the *Milke* somewhat from Turning, or Crudling in the Stomach; And put in Sugar also, for the same cause, and partly for the Taste sake; But you must drinke a good draught, that it may stay lesse time in the Stomach, lest it Cruddle: And let the Cup in which you milke the Cow, be set in a greater Cup of hot water, that you may take it warme. And *Cow-milke* thus prepared, I judge to be better for a *Consumption*, than *Asse-milke*, which (it is true) turneth not so easily, but it is a little harsh; Marry it is more proper for Sharpnesse of Urine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans milke* likewise is prescribed, when all faile; but I commend it not; as being a little too neare the Juyce of Mans Body, to be a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

52

Oyle of Sweet Almonds, newly drawne, with Sugar, and a little Spice, spread upon Bread tosted, is an Excellent Nourisher; But then to keepe the *Oyle* from frying in the Stomach, you must drinke a good draught of *Milde Beere* after it; And to keepe it from relaxing the Stomach too much, you must put in a little Powder of Cinnamon.

53

The Yolkes of *Egges* are of themselves so well prepared by Nature for Nourishment; As (so they bee Potched, or Reare boyled) they need no other Preparation, or Mixture; yet they may be taken also raw, when they are new laid, with *Malmesey*, or *Sweet Wine*; You shall doe well to put in some few Slices of *Eringium Roors*, and a little *Amber-grice*; For by this meanes, besides the immediate Facultie of Nourishment, such Drinke will strengthen the Back; So that it will not draw down the *Urine* too fast; For too much *Urine* doth alwayes hinder Nourishment.

54

Mincing of Meat, as in *Pies*, and *Buttered Minc'd Meat*, saveth the Grinding of the Teeth; And therefore, (no doubt) it is more Nourishing; Especially in Age; Or to them that have weake Teeth; But the Butter is not so proper for weake Bodies; And therefore it were good to moisten it with a little *Claret Wine*, Pill of *Limon*, or *Orange*, cut small, Sugar, and a very little Cinnamon, or *Nutmegg*. As for *Chuetts*, which are likewise minced Meat, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistachomilke*; or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reserve to the due place.

We have hitherto handled the Particulars which yeeld best, and easiest, and plentifullest Nourishment; And now we will speake of the best Meanes of Conveying, and Converting the Nourishment.

55

The First Meanes is, to procure that the Nourishment may not bee robbed, and drawne away; wherein that, which we have already said, is very Materiall; To provide, that the *Reines* draw not too strongly an over-great Part of the Blood into *Urine*. To this adde that Precept of *Aristotle*, that *Wine* bee forborne in all *Consumptions*; For that the *Spirits* of the *Wine*, doe prey upon the *Roside* Juyce of the Body, and inter-common with the *Spirits* of the Body, and so deceive and robbe them of their Nourishment. And therefore if the *Consumption* growing from the weaknesse of the Stomach, doe force you to use *Wine*, let it alwayes be burnt; that the Quicker *Spirits* may evaporate, or at the least quenched with two little wedges of Gold, 6 or 7 times repeated. Adde also this Provision, that there be not too much Expende of

of the Nourishment, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to be followed, who adviseth quite contrary to that which is in use: Namely, that the *Linnen*, or *Garment* next the *Flesh*, be in Winter drie, and oft changed; And in Summer seldome changed, and smeared over with *Oyle*; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to have the *Linnen* smeared lightly over, with *Oyle of Sweet Almonds*; And not to forbear shifting as oft as is fit.

The Second Meanes is, to send forth the Nourishment into the Parts, more strongly; For which, the working must bee by *Strengthening* of the Stomach; And in this, because the Stomach is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the Stomach: Wherein it hath beene tryed, that the *Quills* of *Roses*, *Spices*, *Mastick*, *Wormewood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake of New bread*, and to bedew it with a little *Sack*, or *Ale*; And to drie it, And after it be dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the Stomach: For it is certaine, that all Flower hath a potent Vertue of *Astringion*; In so much as it hardeneth a peece of flesh, or a Flower, that is laid in it: And therefore a *Bagg* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lie long.

The Third Meanes (which may be a branch of the former) is to send forth the Nourishment the better by *Sleepe*. For we see, that Beares, and other Creatures that sleep in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleev'd) that *Sleep* doth Nourish much; Both for that the *Spirits* doe lesse spend the Nourishment in *Sleep*, than when living Creatures are awake: And because (that which is to the present purpose) it helpeth to thrust out the Nourishment into the Parts. Therefore in Aged men, and weake Bodies, and such as abound not with Choller, a short *Sleep* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an over-hasty Digestion, which is the Inconvenience of *Postmeridian Sleeps*. *Sleepe* also in the Morning after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would be done, sitting upright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the Stomach.

The Fourth Meanes is to provide that the Parts themselves may draw to them the Nourishment strongly. There is an Excellent Observation of *Aristotle*; That a great reason, why plants (some of them) are of greater Age, than *Living Creatures*, is, for that they yearly put forth new Leaves, and Boughes; whereas *Living Creatures* put forth (after their Period of Growth,) nothing that is young, but *Haire* and *Nailles*, which are Excrements, and no Parts. And it is most certaine, that whatsoever is young, doth draw Nourishment better, than that which is Old; And then (that which is the Myserie of that Observation) young Boughes, and Leaves, calling the Sap up to them; the same Nourisheth the Body, in the Passage. And this we see notably proved also, in that the oft cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transferré therefore this Observation to the Helping of Nourishment in *Living Creatures*: The Noblest and Principall Use whereof is, for the Prolongation of Life; Restauration of some Degree of *Youth*; and *Ineneration* of the Parts: For certain it is, that there are in *Living Creatures* Parts that Nourish, and Repaire easily; And Parts that

Nourish and Repaire hardly; And you must refresh, and renew those that are easie to Nourish, that the other may be refreshed, and (as it were) Drink in Nourishment, in the Passage. Now wee see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beeffe; And Men after long Emaciating Diets, wax plump, and fat, and almost new: So that you may surely conclude, that the frequent and wise Use of those Emaciating Diets, and of Purgings, And perhaps of some kinde of Bleeding, is a principall Meanes of Prolongation of Life; & Restoring some Degree of Youth: For as we have often said, *Death commeth upon Living Creatures like the Torment of Mezentius.*

Mortua quinetiam jungebat Corpora vivis,

Componens Manibusque Manus, atque Oribus Ora.

For the Parts in Mans Body easily reparable, (as Spirits, Blood, and Flesh) die in the Embrace of the Parts hardly reparable, (as Bones, Nerves, and Membranes;) And likewise some Entrails (which they reckon amongst the Spectaticall Parts) are hard to repaire: Though that Division of Spermatocall, and Menstruall Parts, be but a Conceit. And this same Observation also may be drawne to the present purpose of Nourishing Emaciated Bodies: And therefore Gentle Friction draweth forth the Nourishment, by making the Parts a little hungry, and heating them, whereby they call forth Nourishment the better. This Friction I wish to be done in the Morning. It is also best done by the Hand, or a peece of Scarlet wool, wet a little with Oile of Almonds, mingled with a small Quantitie of Bay-Salt, or Saffron; We see that the very Carrying of Horses doth make them fat, and in good liking.

The fifth Meanes is, to further the very Act, of Assimilation of Nourishment; which is done by some outward Emollients, that make the Parts more apt to Assimilate. For which I have compounded an Ointment of Excellent Odour, which I call Roman Ointment, vide the Receipt. The use of it would be betwene Sleeps; For in the latter Sleepe the Parts Assimilate chiefly.

There be many Medicines, which by themselves would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I have tryed (my selfe) a Remedy for the Gout, which hath seldome failed, but driven it away in 24. Houres space: It is first to apply a Pulvisse; Of which vide the Receipt; And then a Bath or Fomentation, of which vide the Receipt; And then a Plaster, vide the Receipt. The Pulvisse relaxeth the Pores, and maketh the Humour apt to Exhale. The Fomentation callet forth the Humour by Vapours; But yet in regard of the way made by the Pulvisse, Draweth gently; And therefore draweth the Humours out, and doth not draw more to it; For it is a Gentle Fomentation, and hath withall a Mixture, (though very little) of some Stupefactive. The Plaster is a Moderate Astringent Plaster, which repelleth New Humour from falling. The Pulvisse alone would make the Part more soft, and weak; And apter to take the Defluxion and Impression of the Humour. The Fomentation alone, if it were too weak, without way made by the Pulvisse, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The Plaster alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The Pulvisse is to be laid to, for two or three Houres: The Fomentation for a Quarter of an Houre, or somewhat better, being used hot, and seven or eight times repeated: The Plaster to continue on still, till the Part be well confirmed.

There

Experiment
Solitary touching
Fistula
Medicinalis,
60

There is a secret Way of Cure, (unpractized;) By Assuete of that which in it selfe hurteth. Poysons have beene made, by some, Familiar, as hath beene said. Ordinary keepers of the Sicke of the Plague, are seldome infected. Enduring of Tortures, by Custome, hath beene made more easie: The Brooking of Enormous Quantity of Meats, and so of wine or Strong Drinke, hath beene, by Custome, made to be without Surfet, or Drunkenesse. And generally Diseases that are Chronicall, as Coughes, Phthisicks, some kinds of Palsies, Lunacies, &c. are most dangerous at the first: Therefore a wise Physician will consider whether a Disease be Incurable; Or whether the Just Cure of it be not full of perill; And if hee finde it to be such, let him resort to Palliation; And alleviate the Symptome, without busying himselfe too much with the perfect Cure: And many times, (if the Patient be indeed patient,) that Course will exceed all Expectation. Likewise the Patient himselfe may strive, by little and little, to Overcome the Symptome, in the Exacerbation, and so, by time, turne Suffering into Nature.

Divers Diseases, especially Chronicall, (such as Quartian Agues;) are sometimes cured by Surfet, and Excesses: As Excesse of Meat, Excesse of Drinke, Extraordinary Fasting, Extraordinary Stirring, or Lassitude, and the like. The Cause is, for that Diseases of Continuance get an Adventitious Strength from Custome, besides their Materiall Cause from the Humors: So that the Breaking of the Custome doth leave them onely to their first Cause; which if it be any thing weak will fall off. Besides, such Excesses doe Excite and Spur Nature, which thereupon riseth more forcibly against the Disease.

There is in the Body of Man a great Consent in the Motion of the severall Parts. Wee see, it is Childrens sport, to prove whether they can rubbe upon their Brest with one hand, and pat upon their Fore-head with another; And straight wayes they shall sometimes rubbe with both Hands, or pat with both hands. Wee see, that when the Spirits, that come to the Nostrils, expell a bad Sent, the Stomach is ready to Expell by Vomit. Wee find that in Consumptions of the Lungs, when Nature cannot expell by Cough, Men fall into Fluxes of the Belly, and then they die. So in Pestilent Diseases, if they cannot be expelled by Sweat, they fall likewise into Loosenesse, and that is commonly Mortall. Therefore Physicians should ingeniously contrive, how by Motions that are in their Power, they may excite Inward Motions that are not in their Power, by Consent: As by the Stench of Feathers, or the like, they cure the Rising of the Mother.

Hippocrates Aphorisme, In Morbis minus, is a good profound Aphorisme. It importeth, that Diseases, contrary to the Complexion, Age, Sex, Season of the yeare, Diet, &c. are more dangerous than those that are Concurrent. A Man would thinke it should be otherwise; For that, when the Accident of Sicknesse, and the Naturall Disposition, doe second the one the other, the Disease should be more forcible: And so (no doubt) it is; if you suppose like Quantity of Matter. But that which maketh good the Aphorisme, is, Because such Diseases doe shew a greater Collection of Matter, by that they are able to overcome those Naturall Inclinations to the Contrary. And therefore in Diseases of that kinde, let the Physician apply himselfe more to Purgation, than to Alteration; Because the offence is in the Quantity; and the Qualities are rectified of themselves.

C 2

Physicians

Experiment
Solitary touching
Cure by
Custome.
61

Experiment
Solitary touching
Cure by
Excesse.
62

Experiment
Solitary touching
Cure by
Motion of Consent.
63

Experiment
Solitary touching
Cure of
Diseases which
are contrary to
Predisposition.
64

Experiment
Solitary touch-
ing Preparati-
ons before
Purging, and
settling of the
Body afterward
65

Physicians do wisely prescribe, that there bee *Preparatives* used before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Strick- ing of the Humours, and their not comming faire away; Which causeth in the Bodie great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently; Therefore the worke of *Preparation* is double; to make the *Humours* fluide, and mature, And to make the *Passages* more open: For both those helpe to make the Humours passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clsters* also helpe lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies* abounding with *Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in them- selves; because they make the Humours more fluide. But let a *Physitian* be- ware, how hee purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the Lodging of some *Humours* in ill Places: For it is certaine, that there bee *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially *Passages*;) do much mischief. Therefore it is good, after *Purging*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purging*, but *Absterfive* and *Mundifying Clsters* also are good to conclude with, to draw away the Reliques of the Humours, that may have descended to the *Lower Region* of the Bodie.

Experiment
Solitary touch-
ing Stanch-
ing of Blood.
66

Blood is stanch'd divers wayes. First by *Astringents*, and *Repercussive Medicines*. Secondly by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by cold; As *Iron* or a *Stone* laid to the neck doth stanch the Bleeding at the Nose; also it hath been tryed, that the *Testicles* being put into sharp Vi- neger, hath made a suddaine Reccess of the *Spirits*, and stanch'd Blood. Thirdly by the Reccess of the blood by *Sympathy*. So it hath beene tryed, that the part that bleedeth, being thrust into the Body of a Capon, or Sheepe, new ript and bleeding, hath stanch'd Blood; The Blood, as it seemeth, suck- ing & drawing up, by similitude of substance, the Blood it meeteth with, and so it selfe going backe. Fourthly by *Custom* and *Time*; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could finde no meanes to stanch the Blood, either by *Medicine* or *Ligament*; but was faine to have the *Orifice* of the wound stopped by *Mens Thumbs*, succeeding one another, for the space at the least of two Dayes; And at the last the blood by *Custom* onely re- tired. There is a fifth Way also in use, to let Blood in an *Adverse Part*, for a *Revulsion*.

Experiment
Solitary touch-
ing Change
of Aliments
and Medicines.
67

It helpeth, both in *Medicine*, and *Aliment*, to Change and not to conti- nue the same *Medicine* and *Aliment* still. The Cause is, for that *Nature* by continuall Use of any Thing, groweth to a *Sacietie*, and *Dulnesse*, ei- ther of *Appetite*, or *Working*. And we see that *Assuetude* of Things Hurtfull doth makethem lesse their force to Hurt; As *Poyson*, which with use some have brought themselves to brook. And therefore it is no marvaile, though Things helpfull by *Custom*, lesse their force to Helpe, I count *Intermission* al- most the same thing with *Change*; For that, that hath beene intermitted, is after a sort new.

It

IT is found by Experience, that in *Diets* of *Guaiacum*, *Sarza*, and the like (especially if they be strict,) the *Patient* is more troubled in the be- ginning, than after continuance; Which hath made some of the more deli- cate Sort of patients, give them over in the midst; Supposing that if those *Diets* trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, doe drie up *Humours*, *Rheumes*, and the like; And they cannot drie up untill they have first attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, untill it bee dried up, and consumed. And therefore *Patients* must expect a due time, and not check at them at the first.

The Producing of Cold is a thing very worthy the Inquisiti- on; both for Use, and Disclosure of Causes. For *Heat* and *Cold* are *Natures* two hands, whereby she chiefly worketh: And *Heat* we have in readinesse, in respect of the *Fire*; But for *Cold* we must stay till it commeth; or seeke it in deep Caves, or high Mountaines: And when all is done, wee cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farre hotter, than a *Summers Sunne*; But *Vaults* or *Hills* are not much Colder than a *Winters Frost*.

The first *Meanes* of Producing Cold, is that which *Nature* presenteth us withall; Namely the Expiring of cold out of the *Inward Parts* of the *Earth* in *Winter*, when the *Sunne* hath no power to overcome it; the *Earth* being (as hath been noted by some) *Primum Frigidum*. This hath been asserted, as well by Ancient, as by Moderne *Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Autor* of the discourse in *Plutarch*, (for I take it, that booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Telestus*, who hath renewed the *Philosophie* of *Parmenides*, and is the best of the *Novelists*.

The second Cause of Cold is the Contact of Cold Bodies; For Cold is A- ctive and Transitive into Bodies Adjacent, as well as *Heat*: which is seen in those things that are touched with *Snow* or *Cold water*. And therefore, who- soever will bee an *Inquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice*; Such as they use for delicacy, to coole Wine in Summer: Which is a Poore and Contemptible use, in respect of other uses, that may be made of such *Conservatories*.

The Third Cause is the Primary Nature of all *Tangible Bodies*: For it is well to be noted, that all Things whatsoever (*Tangible*) are of themselves Cold; Except they have an Accessory *Heat* by *fire*, *Life*, or *Motion*: For even the *Spirits* of Wine, or *Chymicall Oyles*, which are so hot in Operation, are to the first Touch, Cold; And *Aire* it selfe compressed, and Condensed a little by blowing, is Cold.

The Fourth Cause is the Density of the Body; For all Dense Bodies are Colder than most other Bodies; As *Metals*, *Stone*, *Glasse*; and they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, Dense, *Tangible*, hold all of the Nature of Cold. The Cause is, for that all *Matters Tangible* being Cold, it must needs follow, that where the *Matter* is most Congregate, the Cold is the greater.

Experiment
Solitary touch-
ing Diet.
68

Experiments
in Consort
touching the
Production of
Cold.

69

70

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73

The Fifth Cause of Cold, or rather of increase and vehemency of Cold, is a *Quick Spirit* inclosed in a Cold Body: As will appeare to any that shall attentively consider of Nature in many Instances. Wee see *Nitre* (which hath a *Quick Spirit*) is Cold; more Cold to the Tongue, than a Stone; So *Water* is Colder than *Oile*, because it hath a *Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digested than *Water*, yet hath it a duller *Spirit*: So *Snow* is Colder than *Water*, because it hath more *Spirit* within it: So wee see that *Salt* put to *Ice*, (as in the producing of the Artificiall Ice) increaseth the Activity of Cold: So some *Insecta* which have *Spirit* of Life, as *Snakes*, and *Silkwormes*, are to the touch, Cold. So *Quick-silver* is the Coldest of Metals, because it is fullest of *Spirit*.

74

The Sixth Cause of Cold is the Chasing and Driving away of *Spirits*, such as have some Degree of Heat: For the Banishing of the Heat must needs leave any Body Cold. This wee see in the Operation of *Opium*, and *Stupefactives*, upon the *Spirits* of living Creatures: And it were not amiss to trie *Opium*, by laying it upon the Top of a *weather-glasse*, to see whether it will contract the *Ayre*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a Body as *Glasse*, I conceive that *Opium*, and the like, make the *Spirits* flie rather by Malignity, than by Cold.

75

Seventhly, the same Effect must follow upon the Exhaling or Drawing out of the warme *Spirits*, that doth upon the Flight of the *Spirits*. There is an Opinion, that the *Moone* is Magneticall of Heat, as the *Sunne* is of Cold and Moisture: It were not amiss therefore to trie it, with warme-water; The one exposed to the Beames of the *Moone*, the other with some Skreen betwixt the Beames of the *Moone* and the water; As wee use to the *Sunne* for Shade; And to see whether the former will coole sooner. And it were also good to inquire, what other Meanes there may bee, to draw forth the *Exile heat*, which is in the *Aire*; for that may be a Secret of great Power to Produce Cold weather.

Experiments
in Confort
touching the
Version and
Transmutation
of Aire into
water.

WE E have formerly set down the Meanes of turning *Aire* into water, in the Experiment 27. But because it is *Magnale Nature*; and tendeth to the subduing of a very great effect; And is also of Manifold use; wee will adde some Instances in Confort that give light thereunto.

76

It is reported by some of the *Ancients*, that *Sailers* have used, every Night, to hang *Fleeces of Wooll* on the sides of their *Ships*, the *wooll* towards the water; And that they have crushed fresh *Water* out of them, in the Morning, for their use. And thus much we have tryed, that a *Quantitie* of *Wooll* tyed loose together, being let downe into a deepe *Well*; And hanging in the *Middle*, some three Fathome from the water, for a night, in the *Winter* time; increased in weight, (as I now remember) to a fifth Part.

77

It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certaine *work-men*, in time of Wars fled into *Caves*; And the Mouth of the *Caves* being stopped by the *Enemies*, they were famished. But long time after the dead *Bones* were found; And some *Vessels* which they had carried with them; And the *Vessels* full of *Water*; And that *Water*, thicker, and more towards *Ice*, than *Common Water*: which is a Notable Instance of *Condensation*, and *Induration* by *Buriall under Earth*, (in *Caves*) for long time; And of *version* also (as it should seeme,) of *Aire* into *Water*;

if

if any of those vessels were Empty. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunk; you may bee sure the *Aire* is condensed by the Cold of those *Bodies*; As it would bee in a *Cave* under *Earth*.

It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *Water* open in a Room where *Cloves* are kept, it will bee drawne drie in 24. houres; Though it stand at some distance from the *Cloves*. In the Countrey, they use many times, in deceit, when their *Wooll* is new shorne, to set some *Pailles of Water* by, in the same Room; to increase the weight of the *Wooll*. But it may bee, that the Heat of the *Wooll*, remaining from the body of the *Sheepe*; or the Heat gathered by the lying close of the *Wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*.

It is reported also credibly, that *Wooll* new shorne, being laid casuall upon a *Vessell* of *Verjuice*, after some time, had drunke up a great part of the *Verjuice*, though the *Vessell* were whole without any *Flare*, and had not the Bung-hole open. In this Instance, there is (upon the by) to be noted, the *Percolation*, or *Suing* of the *Verjuice* through the wood; For *Verjuice* of it selfe would never have passed thorow the wood: So as, it seemeth, it must bee first in a kinde of Vapour, before it passe.

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *Water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* have an Antipathy with *Aire*; and if they finde any *Liquid Body*, that is more dense, neare them, they will draw it. And after they have drawne it, they will condense it more, and in effect incorporate it; For wee see that a *Sponge*, or *Wooll*, or *Sugar*, or a *woollen cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquor* higher, and beyond the place: where the *water* or *wine* commeth. Wee see also, that *Wood*, *Lute-strings*, and the like, doe swell in moist Seasons: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth* of *Boxes*, and *Opening* of *Wainscot doors*, which is a kinde of *Infusion*: And is much like to an *Infusion* in water, which will make wood to swell: As we see in the *Filling* of the *Chops* of *Boules*, by laying them in water. But for that part of these Experiments, which concerneth *Attraction*, wee will reserve it to the proper Title of *Attraction*.

There is also a *Version of Aire into water*, scene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist *Aire* thickened against the hard body. But it is plaine, that it is the latter; For that wee see *wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *wood* alone: which is caused by the Smoothnesse and Closenesse, which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. Wee see also, that *Breathing* upon a *Glasse*, or *Smooth body*, giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frost*) you shall finde drops of Dew upon the Inside of *Glasse-windowes*; And the *Frost* it selfe upon the ground, is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the Collonely of the *Sunnes* departure, which is the gentler Cold; *Raine*, by the Cold of that, which they call the *Middle Region* of the *Aire*; which is the more violent Cold.

It is very probable (as hath beene touched) that that, which will turne

Water.

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82

Experiments
in Confort
touching In-
durations of
Bodies.

Water into Ice, will likewise turne *Aire* some Degree nearer unto *Water*. Therefore trie the Experiment of the Artificiall Turning Water into Ice (whereof we shall speake in another place) with *Aire* in place of *Water*, and the Ice about it. And although it be a greater Alteration to turne *Aire* into *Water*, than *Water* into Ice: Yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that Artificiall Conversion of *Water* into Ice, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Induration, or Lapidification, of Substances more soft, is likewise another degree of Condensation; And is a great Alteration in Nature. The Effecting and Accelerating thereof is very worthy to be inquired. It is effected by three Meanes. The first is by Cold; whose Propertie is to Condense, and constipate, as hath beene said. The Second is by Heat; which is not proper but by consequence; For the Heat doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And upon that, the more grosse of the Tangible Parts doe contract and ferre themselves together; Both to avoid Vacuum (as they call it;) And also to Munit themselves against the Force of the Fire, which they have suffered. And the Third is by Assimilation; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of Induration, taking them promiscuously, are many: As the Generation of Stones within the Earth, which at the first are but Rude Earth, or Clay: And so of Minerals, which come (no doubt) at first, of Juices Concrete, which afterward indurate: And so of Porcellane, which is an Artificiall Cement, buried in the Earth a long time: And so the Making of Bricke, and Tile: Also the Making of Glasse, of a certain Sand, and Brake-Roots, and some other Matters: Also the Exudations of Rock-Diamonds, and Crystall, which harden with time: Also the Induration of Bead-Amber, which at first is a soft Substance; As appeareth by the Flies, and Spiders, which are found in it; And many more: But we will speak of them distinctly.

83

For Indurations by Cold, there be few Trials of it; For we have no strong or intense Cold here on the Surface of the Earth, so neare the Beames of the Sunne, and the Heavens. The likeliest Triall is by Snow, and Ice; For as Snow and Ice, especially being holpen, and their Cold activated by Nitre, or Salt, will turne Water into Ice, and that in a few houres; So it may be, it will turne Wood, or Stiffe Clay, into Stone, in longer time. Put therefore, into a Conseruing Pii of Snow, and Ice, (adding some quantity of Salt, and Nitre,) a Peece of Wood, or a Peece of Tough Clay, and let it lie a moneth, or more.

84

Another Triall is by Metalline Waters, which have virtuall Cold in them.

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Put therefore Wood, or Clay, into Smiths water, or other Metalline water; And try whether it will not harden in some reasonable time. But I understand it, of Metalline Waters, that come by Washing, or Quenching; And not of Strong Waters that come by dissolution; for they are too Corrosive to consolidate.

It is alreadie found, that there are some Naturall Spring-waters, that will Inlapidate Wood; So as you shall see one peece of Wood, whereof the Part above the Water shall continue Wood; And the Part under the Water shall be turned into a kinde of Gravelly Stone. It is likely those Waters are of some Metalline Mixture; But there would be more particular Inquiry made of them. It is certaine, that an Egge was found, having lien many yeares in the bottom of a Moat, where the Earth had somewhat overgrown it; And this Egge was come to the Hardnesse of a Stone; And had the Colours of the white and yolke perfect: And the Shell shining in small graines like Sugar, or Alabaſter.

Another Experience there is of Induration by Cold, which is already found; which is, that Metalls, themselves are hardened by often Heating and Quenching in Cold water: For Cold ever worketh most potently upon Heat precedent.

For Induration by Heat, it must be considered, that Heat, by the Exhaling of the Moister Parts, doth either harden the Bodie; As in Bricks, Tiles, &c; Or if the Heat be more fierce, maketh the grosser Part it selfe, Runne and Melt; As in the making of ordinary Glasse; And in the Purification of Earth, (As we see in the Inner Parts of Furnaces;) And in the Virrification of Bricke, And of Metals. And in the former of these, which is the Hardening by baking, without Melting, the Heat hath these degrees; First, it Induratieth; and then maketh Fragile; And lastly it doth Incinerate and Calcinare.

But if you desire to make an Induration with Toughnesse, and lesse Fragilitie; A middle way would be taken; Which is that which Aristotle hath well noted; But would be thoroughly verified. It is, to decoct Bodies in Water, for two or three dayes; But they must be such bodies, into which the Water will not enter; As Stone, and Metall. For if they be Bodies into which the Water will enter, then long Seething, will rather Soften than indurate them; As hath beene tryed in Egges, &c. Therefore, Softer Bodies must be put into Bottles; And the Bottles hung into Water seething, with the mouths open, above the Water; that no Water may get in; For by this Meanes, the virtuall Heat of the Water will enter; And such a Heat, as will not make the Body adust, or fragile; But the Substance of the Water will be shut out. This Experiment we made; and it sorted thus. It was tryed with a peece of Free-Stone, and with Pewter, put into the Water at large. The Free-Stone we found received in some Water; For it was softer, and easier to scrape, than a peece of the same Stone kept drie. But the Pewter into which no Water could enter, became more white, and likerto Silver, and lesse flexible, by much. Therewere also put into an Earthen Bottle, placed as before, a good Pellet of Clay, a Peece of Cheese, a Peece of Chalke, and a Peece of Free-Stone. The Clay came forth almost of the Hardnesse of Stone; The Cheese likewise very hard, and not well to be cut: The Chalke and the Free-Stone much harder than they were. The colour of the Clay inclined not a whit to the Colour of Brick, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trials were made by a Boyling upon a good hot Fire, renewing the Water as it consumed, with other hot Water; But the Boyling

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was but for twelve houres onely; And it is like that the Experiment would have beene more effectually, if the Boyling had been for two or three dayes, as we prescribed before.

89

As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) wee see Examples of it in some *Stones* in *Clay-Grounds*, lying neare to the top of the Earth, where *Pebble* is; In which you may manifestly see divers *Pebbles* gathered together, and a *Crust* of *Cement* or *Stone* between them, as hard as the *Pebbles* themselves: And it were good to make a *Triall* of purpose, by taking *Clay*, and putting in it divers *Pebble Stones*, thicke set, to see whether in continuance of time, it will not bee harder than other *Clay* of the same lump, in which no *Pebbles* are set. Wee see also in Ruines of old Wals, especially towards the Bottome, the *Mortar* will become as hard as the *Brick*; wee see also, that the *Wood* on the sides of *Vessels* of *Wine* gathereth a *Crust* of *Tartar*, harder than the *Wood* it selfe; And *Scales* likewise grow to the *Teeth*, harder than the *Teeth* themselves.

90

Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no *Nourishment* that the *Tree* receiveth, or that the *living Creature* receiveth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment
Solitary touch-
ing the Ver-
sion of water in-
to Aire.

91

THe Eye of the understanding, is like the Eye of the Sense: For as you may see great Objects through small Crannies, or Levels: So you may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* upon *warry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body: Such as doth not at all Detaine, or Imbibe the *Moisture*; For the *Mistiness* scattereth and breaketh up suddenly. But the like *Cloud*, if it were *Oylie*, or *Fatty*, will not discharge, Not because it sticketh faster; But because *Aire* preyeth upon *Water*, And *Flame*, and *Fire*, upon *Oyle*; And therefore, to take out a Spot of Grease, they use a Coale upon browne Paper; Because *Fire* worketh upon Grease, or *Oyle*, as *Aire* doth upon *Water*. And wee see *Paper* oyled, or *Wood* oyled, or the like, last long moist; but *wet* with *water*, drie, or putrifie sooner. The Cause is, for that *Aire* medleth little with the *Moisture* of *Oyle*.

Experiment
Solitary touch-
ing the Force of *Vnion*.

92

THere is an Admirable demonstration, in the same trifling *Instance* of the little *Cloud* upon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force* of *Vnion*, even in the least Quantities, and weakest Bodies, how much it conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*. And you shall see it ever break up, first in the Skirts, and last in the middest. We see likewise, that much *water* draweth forth the *Juyce* of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation upon Bodies, for their *Version* or *Alteration*, the *Triall* in great Quantities, doth not answer the *Triall* in small; And so deceiveth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that should subdue it.

Experiment
Solitary touch-
ing the Pro-
ducing of Fea-
thers and
Haires of di-
vers Colours.

93

WE have spoken before, in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; Which is by the Fineness of the Strainer; wee will now endeavour to reduce the same *Axiome* to a worke. For this Writ-
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ting of our *Sylva Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description onely of *Nature*, but a Breaking of *Nature*, into great and strange Workes. *Trieth* therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their Downe; Or of *whelps*, cutting their Haire as short as may bee; Or of some other Beast; with some oymntment, that is not hurtfull to the *Flesh*; And that will harden, and stick very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is received, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *white* is a penurious Colour, and where moisture is scant. So *Blew Violets*, and other *Flowers*, if they be starved, turne *Pale* and *white*; *Birds*, and *Horses*, by Age, or Scares, turne *white*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that come first, will be many times of divers Colours, according to the Nature of the *Bird*; For that the *Skinne* is more porous; But when the *Skin* is more shut, and close, the *Feathers* will come *white*. This is a good Experiment, not onely for the Producing of *Bird* and *Beasts* of strange Colours, but also, for the Disclosure of the Nature of *Colours* themselves; which of them require a finer Porositie, and which a grosser.

IT is a worke of Providence, that hath beene truly observed by some; That the *Tolke* of the *Egge*, conduceth little to the Generation of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Tolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe, have in the *Egge*, as well Matter of *Nourishment*, as Matter of generation for the Body. For after the *Egge* is laid, and severed from the Body of the *Hen*; It hath no more *Nourishment* from the *Hen*; But onely a quickning Heat when shee sitteth. But *Beasts*, and Men need not the matter of *Nourishment* within themselves; Because they are shaped within the Wombe of the Female, and are *Nourished* continually from her Body.

IT is an Inveterate and received Opinion, that *Can barides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Received, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to move *Gravell*, and to dissolve the *Stone*; In so much, as laid but to the *Wrest*, it hath so forcibly sent downe *Gravell*, as Men have beene glad to remove it; It was so violent.

It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As wee see, *Going wet-shod*, to those that use it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mysticall, prescribeth, for the Cure of the *Rheume*, that a Man should walke Continually upon a *Camomill Alley*; Meaning, that he should put *Camomill* within his Sockes. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applyed unto them, provoke *Sleepe*.

It seemeth, that as the *Feet* have a Sympathy with the *Head*; So the *Wrests* and *Hands*, have a Sympathy with the *Heart*; Wee see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tried, that *Juyces* of *Stock-Gilly-Flowers*, *Rose-Campian*, *Garlicke*, and other things; applyed to the *Wrests*, and renewed; have cured long *Agues*.

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Experiment
Solitary touch-
ing the Nour-
ishment of Li-
ving Creatures
before they be
brought forth.

94

Experiments
in Confort
touching the Sym-
pathy and Anti-
pathy for Medi-
cinall use.

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97

And I conceive, that wathing with certaine *Liquours*, the *Palmes* of the *Hands*, doth muchgood: And they doe well in *Heats* of *Agues*, to hold in the *Hands*, *Egges* of *Alabaster*, and *Balls* of *Crystall*.

Of these things we shall speake more, when wee handle the Title of Sympathy and Antipathy, in the proper Place.

Experiment
Solitary touch-
ing the Se-
cret Processes of
Nature.

98

THe Knowledge of man (hitherto) hath been determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Finenesse* of the Body it selfe; Or the *Smallnesse* of the Parts; Or of the *Subtiltie* of the Motion; is little inquired. And yet these be the Things that Govern Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumatics*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will have them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will have them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they see, whereas they are Things by themselves. And then, when they come to Plants and living Creatures, they call them *Soules*. And such Superficiall Speculations they have; Like Prospectives, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in Nature. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of Bodies, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are never (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colligation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and most of the Effects of Nature: For, as we have figured them in our *Sapientia Veterum*, in the *Fable of Proserpina*, you shall in the *Infernall Regiment* heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in Bodies are Stupid things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in Bodies, the industry of the *Chymists* hath given some light, in discerning by their Separations, the *Oyle*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of Bodies, and the like. And the *Physitians* are content to acknowledge, that *Herbs* and *Drugs* have divers Parts; As that *Opium* hath a *Stupefactive Part*, and a *Heating Part*; The one moving Sleepe, the other a Sweat following; And that *Rubarb* hath *Purging Parts*, and *Astringent Parts*, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts* of Bodies, which doe so great Effects, they have not beene observed at all; because they are Invisible, and incur not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in Sunne; *Atomus* (saith he) *necessitate Rationis & Experientia esse convincitur; Atomum enim nequaquam videtur*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all *Flight* of Bodies thorow the *Aire*, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be thoroughly handled in due place,) is not seene

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at all. But neverthelesse, if you know it not, or enquire it not attentively and diligently, you shall never be able to discern, and much lesse to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the Effects (which were mentioned before) passe between the *Spirits*, and the *Tangible Parts*, (which are, *Arefaction*, *Colligation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Passions*, and such other *Logicall Words*.

IT is certaine, that of all Powers in Nature, Heat is the chiefe; both in the Frame of Nature, and in the workes of Art. Certaine it is likewise, that the Effects of Heat, are most advanced, when it worketh upon a Body, without losse or dissipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of Heat is best perceived in *Distillations*, which are performed in close Vessels, and Receptacles. But yet there is a higher Degree; For howsoever *Distillations* doe keepe the Body in Cells, and Cloysters, without Going abroad, yet they give space unto Bodies to turne into Vapour; To returne into Liquour; And to Separate one part from another. So as Nature doth Expatriate, although it hath not full Liberty: Whereby the true and Ultime Operations of Heat are not attained. But if Bodies may be altered by Heat, and yet no such Reciprocation of *Rarefaction*, and of *Condensation*, and of *Separation*, admitted; then it is like that this *Proteus* of Matter, being held by the Sleeves, will turne and change into many *Metamorphoses*. Take therefore a *Square Vessell* of Iron, in forme of a Cube, and let it have good thicke and strong Sides. Put into it a Cube of Wood, that may fill it as close as may be; And let it have a Cover of Iron, as strong (at least) as the Sides; And let it be well Luted, after the manner of the *Chymists*. Then place the Vessell within burning Coales, kept quicke kindled, for some few houres space. Then take the Vessell from the Fire, and take off the Cover, and see what is become of the Wood. I conceive that since all *Inflammation*, and *Evaporation* are utterly prohibited, and the Body still turned upon it Selfe, that one of these two Effects will follow: Either that the Body of the Wood will be turned into a kinde of *Amalgama*, (as the *Chymists* call it;) Or that the Finer Part will be turned into *Aire*, and the Grofser sticke as it were baked, and incrustate upon the Sides of the Vessell, being become of a Denser Matter, than the Wood it selfe, Crude. And for another Triall, take also Water, and put it in the like Vessell, stopped as before; But use a gentler Heat, and remove the Vessell sometimes from the Fire; And againe, after some small time, when it is Cold, renew the Heating of it: And repeat this Alteration some few times: And if you can once bring to passe, that the Water, which is one of the Simplest of Bodies, be changed in Colour, Odour, or Taste, after the manner of Compound Bodies, you may be sure that there is a great Worke wrought in Nature, and a Notable Entrance made into strange Changes of Bodies, and productions: And also a Way made, to doe that by Fire, in small time, which the Sunne and Age doe in long time. But of the Admirable Effects of this *Distillation in Close*, (for so we call it) which is like the *Wombes* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; We will speake fully, in the due place; Not that we Aime at the making of *Paracelsus Piquey's*; Or any such Prodigious Follies; But that we know the Effects of Heat will be such, as will scarce fall under the Conceit of Man; If the force of it bee altogether kept in.

Experiment
Solitary touch-
ing the
Power of Heat

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There

Experiment
Solitary tou-
ching the Im-
possibility of
Annihilation.
100

There is nothing more Certain in Nature, than that it is impossible for any *Body*, to be utterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Seet* of the *Chymists*; That there is no such way to effect the *Strange Transmutations* of *Bodies*, as to endeavour and urge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of *Bodies* from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, because they are utterly Heterogeneous; Nor make a *Round* and *Circulation* within themselves; they will never change, though they be in their Nature never so Perishable, or Mutable. Wee see, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceive the like will bee of *Bodies* put into *Quick-silver*. But then they must be but thinne, As a lease, or a peece of Paper, or Parchment; For if they have a greater Crassitude, they will alter in their own Body, though they spend not. But of this, Wee shall speake more, when we handle the *Title of Conservation of Bodies*.

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NATVRALL HISTORIE.

II. Century.



MUSIQUE in the *Practice*, hath beene well pursued; And in good Varietie; But in the *Theory*, and especially in the *Teelding* of the *Causes* of the *Practique*, very weakly; being reduced into certaine Mysticall Subtillties, of no use, and not much Truth. We shall therefore, after our manner, joyne the *Contemplative* and *Active Part* together.

All *Sounds*, are either *Musicall Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are ever *Equall*; As *Singing*, the *Sounds* of *Stringed*, and *Wind-Instruments*, the *Ring*ing of *Bells*, &c. Or *Immusicall Sounds*; which are ever *Vnequall*; Such as are the *Voyce* in *Speaking*, all *Whisperings*, all *Voyces* of *Beasts*, and *Birds*, (except they bee *Singing Birds*;) all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins*, (as in *Drummes*;) and infinite others.

The *Sounds* that produce *Tones*, are ever from such *Bodies*, as are in their *Parts* and *Pores* *Equall*; As well as the *Sounds* themselves are *Equall*; And such are the *Percussions* of *Metall*, as in *Bells*; Of *Glasse*, as in the *Fillipping* of a *Drinking Glas*; Of *Aire*, as in *Mens voices* whilst they *Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*, as in the *Nightingale Pipes* of *Regalls*, or *Organs*, and other *Hydraulicks*; which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man think, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created betwene the *Bow* or *Plectrum*, and the *String*; But betwene the *String* and the *Aire*; No more than it is betwene the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that

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create

Experiments
in Consort
touching Mu-
sicke.

101

102

create *Tones*; *Percussions of Metals*, (comprehending *Glasse*, and the like;) *Percussions of Aire*; and *Percussions of Water*.

103 The *Diapason* or *Eight* in *Musick* is the sweetest *Concord*; In so much, as it is in effect an *Unison*; As we see in *Lutes*, that are strung in the *Base Strings* with two strings, one an *Eight* above another, which make but as one *Sound*. And every *Eight Note* in *Alcent*, (as from *Eight* to *Fifteene*, from *Fifteene* to *twenty two*, and so in *infinitum*;) are but *Scales of Diapason*. The *Cause* is *dark*, and hath not been rendered by any; And therefore would be better contemplated. It seemeth that *Aire*, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been said) admitteth much *Varietie*; As we see in the *Voyces of Living Creatures*; And likewise in the *Voyces of severall Men*; (for we are capable to discern severall *Men* by their *Voyces*;) And in the *Conjugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the *Sounds* which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such *varietie*; But is forced to recurre into one and the same *Posture* or *Figure*, onely differing in *Greatnesse* and *Smalnesse*. So we see *Figures* may be made of *lines*, *Crooked* and *Straight*, in infinite *Varietie*, where there is *Inequality*; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of *Equall lines*) can differ but in *Greater*, or *Lesser*.

104 It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number of Eight*, to create the *Diapason*;) that this *Computation of Eight*, is a thing rather received, than any true *Computation*. For a true *Computation* ought ever to be, by *Distribution* into *equall Portions*. Now there be intervenient in the *Rise of Eight* (in *Tones*) two *Beemolls*, or *Halfe-notes*; So as if you divide the *Tones* equally, the *Eight* is but *Seven whole and equall Notes*; And if you subdivide that into *Halfe Notes*, (as it is in the *Stops of a Lute*;) it maketh the *Number of thirteene*.

105 Yet this is true; That in the ordinary *Rises* and *Falls* of the *Voyce of Man*, (not measuring the *Tone* by whole *Notes*, and halfe *Notes*, which is the *Equall Measure*;) there fall out to be two *Beemolls* (as hath beene said) betwene the *Unison* and the *Diapason*: And this *Varying* is naturall. For if a Man would endeavour to raise or fall his *Voyce*, still by *Halfe-Notes*, like the *Stops of a Lute*; or by whole *Notes* alone, without *Halves*; as farre as an *Eight*; hee will not be able to frame his *Voyce* unto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all *Harmonickall* use, one *halfe Note* to be interposed.

106 It is to be considered, that whatsoever *Vertue* is in *Numbers*, for *Conducing* to *Concent of Notes*, is rather to be ascribed to the *Ante-number*, than to the *Entire Number*; As namely, that the *Sound* returneth after *Six*, or after *Twelve*; So that the *Seventh*, or the *Thirteenth* is not the *Matter*, but the *Sixth*, or the *Twelfth*; And the *Seventh* and the *Thirteenth* are but the *limits* and *Boundaries* of the *returne*.

107 The *Concords* in *Musick* which are *Perfekt*, or *Semiperfekt*, betwene the *Unison*, and the *Diapason*, are the *Fifth*, which is the most *Perfekt*; the *Third* next; And the *Sixth* which is more *harsh*: And as the *Ancients* esteemed, and so doe my selfe and some Other yet, the *Fourth* which they call *Diatesseron*. As for the *Seventh*, *Twelfth*, *Thirteenth*, and so in *Infinitum*; they be but *Recurrances* of the *Former*; viz. of the *Third*, the *Fifth*, and the *Sixth*, being an *Eight* respectively from them.

108 For *Discords*, the *Second*, and the *Seventh*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the One is next above the *Unison*, the Other

Other next under the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there be a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are *Odious*; And therefore the ordinary *Concent of Foure Parts* consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more *Aire*, doth overcome and drowne the *Treble* (unless the *Discord* be very *Odious*;) And so hideth a small *Imperfection*. For we see, that in one of the lower *Strings* of a *Lute*, there soundeth not the *Sound* of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Base*.

We have no *Musick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we see the *Halfe-Notes* themselves doe but interpose sometimes. Nevertheless we have some *Slides* or *Relishes*, of the *Voyce*, or *Strings*, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull.

The *Causes* of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There be two Things *Pleasing* to the *Sight* (leaving *Pictures*, and *Shapes* aside, which are but *Secondary Objects*; And please or displease but in *Memory*;) these two are, *Colours*, and *Order*. The *pleasing of Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the *Pleasing of Order* doth symbolize with *Harmony*. And therefore we see in *Garden-knots*, and the *Frets of Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *unequall Figures* are but *Deformities*. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the *Effects of Equality*, *Good Proportion*, or *Correspondence*: So that (out of *Question*) *Equality*, and *Correspondence*, are the *Causes of Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding we shall speake somewhat, (when we handle *Tones*;) in the generall Enquiry of *Sounds*.

Tones are not so apt altogether to procure *Sleep*, as some other *Sounds*; As the *wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voyce* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, because they are *Equall*, and slide not, doe more strike and erect the *Sense*, than the other. And Overmuch *Attention* hindreth *Sleep*.

There be in *Musick* certaine *Figures*, or *Tropes*; almost agreeing with the *Figures of Rhetorick*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Division* and *Quivering*, which please so much in *Musick*, have an Agreement with the *Glittering of Light*; As the *Moon-Beames* playing upon a *Wave*. Again, the *Falling* from a *Discord* to a *Concord*, which maketh great Sweetnesse in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone glutted with that which is sweet alone. The *Sliding from the Close* or *Cadence*, hath an Agreement with the *Figure* in *Rhetorick*, which they call *Præter Expectatum*; For there is a *Pleasure* even in being deceived. The *Repetitions*, and *Fuges*, have an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Tradition*. The *Triplés*, and *Changing of times*, have an Agreement with the *Changes of Manners*; As when *Galliard Time*, and *Measure Time*, are in the *Melley* of one *Dance*.

It hath beene anciently held, and observed, that the *Sense of Hearing*, and the *Rules of Musick*, have most Operation upon *Manners*; As to *Incorrupt Men*,

Men, and make them warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and inclin'd to Pitty, &c. The Cause is, for that the *Sense of Hearing* striketh the *Spirits* more immediately, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, have their Organs, not of so present and immediate Access to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediatly upon the *Spirits*, and is forcible while the Object remaineth,) it is with a communication of the Breath, or Vapour of the Object *Odorate*: But *Harmony* entring easily, and Mingling not at all, and Comming with a manifest Motion; doth by Custome of often Affecting the *Spirits*, and Putting them into one kinde of Posture, alter not a little the Nature of the *Spirits*, even when the Object is removed. And therefore we see, that *Tunes* and *Aires*, even in their owne Nature, have in themselves some Affinitie with the *Affections*; As there bee *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens mindes to Pitty*; *Warlike Tunes*; &c. So as it is no Marvell, if they alter the *Spirits*; considering that *Tunes* have a Predisposition to the Motion of the *Spirits* in themselves. But yet it hath beene noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of Passions, conforme unto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. Wee see also that severall *Aires*, and *Tunes*, doe please severall *Nations*, and *Persons*, according to the Sympathy they have with their *Spirits*.

Perspectiv hath beene with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as farre as concerneth *Musick*. But the *Nature of Sounds* in generall, hath beene superficially observed. It is one of the subtillest Peeces of Nature. And besides, I practise, as I doe advise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subject, which is Immaterial, or lesse Material; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heavens* turne about, in a most rapide Motion, without *Noise* tous perceived; Though in some *Dreames* they have beene said to make an excellent *Musick*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it be thought, that it is the Greatnesse of distance from us, whereby the *Sound* cannot be heard; We see that *Lightnings*, and *Coruscations*, which are neare at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Division of the *Aire*. The *Windes* in the *Vpper Region* (which move the *Clouds* above (which we call the *Racke*) and are not perceived below) passe without *Noise*. The *lower Windes* in a *Plaine*, except they be strong, make no *Noise*; But amongst *Trees*, the *Noise*, of such *Windes* will be perceived. And the *Windes* (generally) when they make a *Noise*, doe ever make it unequally, Rising and Falling, and sometimes (when they are vehement,) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing through the *Aire*, till it fall upon the Ground, Water, Houses, or the like. *Water* in a *River* (though a swift Streame) is not heard in the Channell,

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in Confort
touching
Sounds; and
first touching
the Nullity, and
Entity of
Sounds.

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but runneth in Silence, if it be of any depth; But the very *Streame* upon *Shal-lones*, of *Gravell*, or *Pebble*, will be heard. And *Waters*, when they beat upon the *Shore*, or are strained, (as in the falls of *Bridges*;) Or are dashed against themselves, by *Winds*, give a *Roaring Noise*. Any peeces of *Timber*, or *Hard Body*, being thrust forwards by another *Body* Contiguous, without knocking, giveth no *Noise*. And so *Bodies* in weighing, one upon another, though the upper *Body* presse the lower *Body* downe, make no *Noise*. So the Motion in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though unobserved;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulsion of the Parts. So it is manifest; That where the Anterior *Body* giveth way, as fast as the Posterior commeth on, it maketh no *Noise*; be the Motion never so great, or swift.

A re open, and at large, maketh no *Noise*, except it bee sharply percussed; As in the *Sound* of a String, where *Aire* is percussed by a hard, and stiffe *Body*; And with a sharp loose; For if the String be not strained, it maketh no *Noise*. But where the *Aire* is peat, and straitned, there Breath, or other Blowing, (which carry but a gentle Percussion,) suffice to create *Sound*; As in *Pipes*, and *Windle-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the Concave of the *Pipe*, were it not for the *Fipple*, that straitneth the *Aire*, (much more than the *Simple Concave*;) would yeeld no *Sound*. For as for other *Windle-Instruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters-Hornes*, &c. Which appeareth by the blowne Cheeks of him that windeth them. Organs also are blowne with a strong winde, by the Bellows. And note againe, that some kinde of *Windle-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first Entrance; The rather, in respect of their *Traverse*, and Stop above the Hole, which performeth the *Fipples* Part; As it is seene in *Flutes*, and *Fifes*, which will not give *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *whistling*, you contract the Mouth; And to make it more sharpe, Men sometimes use their Finger. But in *Open Aire*, if you throw a *Stone*, or a *Dart*, they give no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire*: Nor yet *Arrows*, except they bee ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small whistles*, or *Shepherds Oaten Pipes*; they give a *Sound*, because of their extreme Slenderness, whereby the *Aire* is more peat, than in a *Wider Pipe*. Again, the *Voyces of Men*, and Living Creatures, passe through the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the Mouth.

Solide Bodies, if they be very softly percussed, give no *Sound*; As when a Man treadeth very softly upon *Boards*. So *Chests* or *Diores* in faire weather, when they open easily, give no *Sound*. And *Cart-wheels* squeak not when they are liquoured.

The *Flame of Tapers*, or *Candles*, though it be a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire* in *Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it self, and is repercussed, yet it is without *Noise*.

Flame percussed by Aire, giveth a *Noise*; As in blowing of the Fire by Bellows; Greater, than if the Bellows should blow upon the *Aire* it selfe. And so likewise *Flame Percussing the Aire strongly*, (as when *Flame* suddenly taketh and openeth,) giveth a *Noise*; So, *Great Flames*, whiles the one impelleth the other, give a bellowing *Sound*.

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There is a Conceit turnerh abroad, that there should be a *white Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may caule secret Murthers. But it seemeth to me unpossible; For, if the *Aire pent*, be driven forth, and strike the *Aire open*, it will certainly make a *Noise*. As for the *white Powder*, (if any such thing bee, that may extinguish, or dead the *Noise*;) it is like to bee a Mixture of *Peire*, and *Sulphur*, without *Coale*. For *Peire* alone will not take Fire. And if any Man thinke, that the *Sound* may bee extinguished, or deaded, by discharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more divided *Sounds*: As if you should make a Crosse Barrell hollow, thorow the Barrell of a Peece, it may be, it would give severall *Sounds*, both at the Nose, and at the Sides. But I conceive, that if it were possible, to bring to passe, that there should be no *Aire pent* at the Mouth of the Peece, the Bullet might flie with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh upon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must bee made by taking some small *Concave* of *Metall*, no more than you meane to fill with Powder; And laying the *Bullet* in the Mouth of it, halfe out into the *Open Aire*.

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I heard it affirmed by a Man, that was a great Dealer in Secrets, but hee was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to have killed *Queene Mary*, Sister to *Queen Elizabeth*, by a *Burning Glasse*, when shee walked in *Saint James Parke*, from the Leads of the House. But thus much (no doubt) is true; That if *Burning Glasses* could bee brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Navy*;) the *Percussion* of the *Aire* alone, by such a *Burning-Glasse* would make no *Noise*; No more than is found in *Corruscations*, and *Lightnings*, without *Thunders*.

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I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to bee conveyed to the *Senje*; As well as the *Impression* of *Species visible*. Or else they will not be heard. And therefore, as the *Bullet* moveth so swift, that it is *Invisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For wee see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*.

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All *Eruptions* of *Aire*, though small and slight, give an *Entiue* of *Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-salt*, and *Bay-leaves*, cast into the Fire; So in *Chestnuts*, when they leap forth of the Ashes; So in *Greene Wood* laid upon the Fire, especially *Roots*; So in *Candles* that spit Flame, if they be wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose-leaf* gathered together into the fashion of a Purse, and broken upon the Forehead, or Backe of the Hand, as Children use.

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duction, Conser-
vation, and De-
struction of Sounds;
And the Office
of the Aire
therein.

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THE Cause given of *Sound*, that it should be an *Elision* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting*, or *Dividing*, or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit upon a few Instances; As the Manner is in the *Philosophy* Received. And it is common with Men, that if they have gotten a Pretty Expression, by a *Word* of *Art*, that Expression goeth currant; though it be empty of *Matter*. This Conceit of *Elision*, appeareth most manifestly to

to be false, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, sometime, after the *Percussion*; But ceaseth straight-ways, if the *Bell*, or *String*, be touched and stayed: whereas, if it were the *Elision* of the *Aire*, that made the *Sound*, it could not bee, that the Touch of the *Bell*, or *String*, should extinguish so suddenly that Motion, caused by the *Elision* of the *Aire*. This appeareth yet more manifestly, by *Chiming* with a Hammer, upon the Out-side of a *Bell*; For the *Sound* will be according to the inward Concave of the *Bell*; whereas the *Elision*, or *Attenuation* of the *Aire*, cannot be but onely betweene the *Hammer*, and the Out-side of the *Bell*. So againe, if it were an *Elision*, a broad *Hammer*, and a *Bodkin*, struck upon *Metall*, would give a divers *Tone*; As well as a divers *Loudnesse*: But they doe not so; For though the *Sound* of the one be *Louder*, and of the other *Softer*, yet the *Tone* is the same. Besides, in *Eccho's* (whereof some are as loud as the *Originall Voice*;) there is no new *Elision*, but a *Repercussion* onely. But that which convinceth it most of all, is; that *Sounds* are generated, where there is no *Aire* at all. But these and the like Conceits, when Men have cleared their understanding, by the light of Experience, will scatter, and breake up like a Mist.

It is certaine, that *Sound* is not produced at the first, but with some *Locall Motion* of the *Aire*, or *Flame*, or some other *Medium*; Nor yet without some *Resistance*, either in the *Aire*, or the *Body Percussed*. For if there be a meere Yeelding, or Cession, it produceth no *Sound*; As hath beene said. And therein *Sounds* differ from *Light*, and *Colours*; which passe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the first, or after. But you must attentively distinguish, between the *Locall Motion* of the *Aire*, (which is but *Vehiculum Cause*, A Carrier of the *Sounds*;) and the *Sounds* themselves, Conveyed in the *Aire*. For as to the former, we see manifestly, that no *Sound* is produced (no not by *Aire* it selfe against other *Aire*, as in *Organs*, &c.) but with a perceptible *Blast* of the *Aire*; And with some *Resistance* of the *Aire* stricken. For even all *Speech*, (which is one of the gentlest *Motions* of *Aire*;) is with *Expulsion* of a little *Breath*. And all *Pipes* have a *Blast*, as well as a *Sound*. We see also manifestly, that *Sounds* are carried with *wind*: And therefore *Sounds* will be heard further with the *wind*, than against the *wind*; And likewise doe rise and fall with the *Intension* or *Remission* of the *wind*. But for the *Impression* of the *Sound*, it is quite another Thing; And is utterly without any *Locall Motion* of the *Aire*, Perceptible; And in that resembleth the *Species Visible*: For after a *Man* hath lured, or a *Bell* is rung, we cannot discern any *Perceptible Motion* (at all) in the *Aire*, along as the *Sound* goeth; but onely at the first. Neither doth the *wind* (as farre as it carryeth a *Voice*;) with the *Motion* thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Varietie of *VWords*. And if a *Man* speake a good loudnesse, against the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*, will move the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation* of Things visible; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

Nevertheless it is true, that upon the *Noise* of *Thunder*, and great *Ordinance*, Glasse windowes will shake; and Fishes are thought to bee frayed with

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with the Motion, caused by *Noise* upon the water. But these Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound*, (as hath bene said;) and not from the *Sound*.

127 It hath bene anciently reported, and is still received, that *Extreme Applauses*, and *Shouting of People* assembled in great Multitudes, have so rarified, and broken the *Aire*, that *Birds* flying over, have fallen downe, the *Aire* being not able to support them. And it is beleevd by some, that *Great Ringing of Bells* in populous Cities, hath chased away *Thunder*: and also dissipated *Pestilent Aire*: All which may bee also from the Concussion of the *Aire*, and not from the *Sound*.

128 A very great *Sound*, neare hand, hath stricken many *Deafe*; And at the Instant they have found, as it were, the breaking of a Skin or Parchment in their Eare: And my Selfe standing neare one that *Lured* loud, and shrill, had suddenly an Offence, as if somewhat had broken, or bene dislocated in my Eare; And immediately after, a loud *Ringing*; (Not an ordinary Singing, or Hissing, but farre louder, and differing;) so as I feared some *Deafenesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred unto the *Sound*: For (as is commonly received) an over-potent Object doth destroy the *Sense*; And *Spirituall Species*; (both *Visible* and *Audible*,) will worke upon the Sensories, though they move not any other Body.

129 In *Delation of Sounds*, the *Enclosure* of them preserveth them, and causeth them to be heard further. And we find in Rowles of Parchment, or Truncks, the Mouth being laid to the one end of the Rowle of Parchment, or Trunk, and the Eare to the other, the *Sound* is heard much further, than in the *Open Aire*. The Cause is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such *Concaves* it is conserved, and contracted. So also in a Peece of Ordnance, if you speake in the Touch-hole, and another lay his Eare to the Mouth of the Peece, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

130 It is further to be considered, how it proveth and worketh, when the *Sound* is not enclosed all the Length of his Way, but passeth partly through open *Aire*; As where you speake some distance from a *Truncke*; or where the Eare is some distance from the *Truncke*, at the other End; Or where both Mouth and Eare are distant from the *Truncke*. And it is tried, that in a long *Truncke*, of some eight or tenne foot, the *Sound* is holpen, though both the Mouth, and the Eare be a handfull, or more, from the Ends of the *Truncke*; And somewhat more holpen, when the Eare of the Hearer is neare, than when the Mouth of the Speaker. And it is certaine, that the *Voyce* is better heard in a *Chamber* from abroad, than abroad from within the *Chamber*.

131 As the *Enclosure*, that is *Round about and Entire*, preserveth the *Sound*; So doth a *Semi-Concave*, though in a lesse degree. And therefore, if you divide a *Truncke*, or a *Cane* into two, and one speake at the one end, and you lay your Eare at the other, it will carry the *Voyce* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concave*; but if you doe the like upon the Mast of a Ship, or a long Pole, or a *Peece of Ordnance* (though one speake upon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voyce* will be heard further, than in the *Aire* at large.

132 It would bee tried, how, and with what proportion of disadvantage, the *Voyce* will be carried in an *Horne*, which is a line Archd; Or in a *Trumpet*, which is a line Retorted; Or in some *Pipe* that were Sinuous.

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It is certaine, (howsoever it crosse the Received Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the most favourable *Deferent* of *Sounds*. Take a *Vessell of Water*, and knap a paire of Tongs some depth within the Water, and you shall heare the *Sound* of the Tongs well, and not much diminished; And yet there is no *Aire* at all present.

Take one *Vessell* of *Silver*, and another of *Wood*, and fill each of them full of Water, and then knap the Tongs together, as before, about an handfull from the Bottome, and you shall finde the *Sound* much more Resounding from the *Vessell* of *Silver*, than from that of *Wood*: And yet if there be no water in the *Vessell*, so that you knap the Tongs in the *Aire*, you shall finde no difference, betweene the *Silver* and the *Woodden Vessell*. Whereby, beside the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Vessell*: The other, that such a Communication passeth farre better, thorow Water than *Aire*.

Strike any *Hard Bodies* together, in the midst of a *Flame*, and you shall heare the *Sound* with little difference, from the *Sound* in the *Aire*.

The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some Affinity with the *Aire*; performeth, in some degree, the Parts of the *Aire*; As when you knock upon an *Empty Barrell*, the *Sound* is (in part) created by the *Aire* on the Out-side; And (in part) by the *Aire* in the Inside; For the *Sound* will be greater or lesser, as the *Barrell* is more Empty, or more Full; But yet the *Sound* participateth also with the *Spirit* in the *Wood*, thorow which it passeth, from the Out-side to the Inside: And so it commeth to passe in the *Chiming of Bells*, on the Outside; where also the *Sound* passeth to the Inside: And a number of other like Instances, whereof we shall speake more when we handle the *Communication of Sounds*.

It were extreme Grossnesse to think, (as we have partly touched before, that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehement motions*, Passages to the Creation of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first motion of the *String*; but by the *Retourne* or *Reflex* of the *String*, which was strained by the Touch, to his former Place: which Motion of *Reflex* is quick and sharpe; Whereas the first Motion is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuell *Trepidation*.

Take a *Truncke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The Cause is, for that *Sound* diffuseth it selfe in round, And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be madeto go all into a Canale; It must needs give greater force to the *Sound*. And so you may note, that *Enclosures* doe not only preserve *Sound*, but also encrease and sharpen it.

A *Hummers Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The Cause is, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards having more Room to spread at the greater End, do dilate themselves; And in coming out striketh more *Aire*; whereby the *Sound* is the Greater, and Baser. And even *Hummers Hornes*, which are sometimes made straight, and not Oblique, are ever greater at the lower end. It would

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be tried also in *Piper*, being made far larger at the lower End: Or being made with a *Belly* towards the lower End; And then issuing into a straight Concave againe.

140 There is in *Saint James's Fields*, a *Conduit* of Brick, unto which joyneth a low *Vault*; And at the End of that, a *Round House* of Stone: And in the *Brick Conduit* there is a Window; And in the *Round House* a Slit or Rift of some little breadth: If you cry out in the Rift, it will make a fearfull roaring at the Window. The Cause is the same with the former; For that all *Concaves*, that proceed from more Narrow to more Broad, do amplify the *Sound* at the Comming out.

141 *Hawkes Bell*, that have Holes in the Sides, give a greater Ring, than if the Peller did strike upon *Brasse*, in the *Open Aire*. The Cause is the same with the first Instance of the *Trunck*; Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* unspent, and more strong.

142 In *Drums*, the Closeness round about, that preserveth the *Sound* from disperfing, maketh the *Noise* come forth at the *Drum-Hole*, farre more loud, and strong, than if you should strike upon the like *Skin*, extended in the *Open Aire*. The Cause is the same with the two precedent.

143 *Sounds* are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noone*, or in the *Day*. The Cause is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thick (as in the *Night*) the *Sound* spendeth and spreadeth abroad lesse: And so it is a Degree of *Enclosure*. As for the *Night*, it is true also, that the Generall Silence helpeth.

144 There be two kinds of *Reflexions* of *Sounds*; The one at *Distance*, which is the *Echo*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly; Of which we shall speak hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly upon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musick* upon the *Water* soundeth more; And so likewise *Musick* is better in *Chambers* *Wainscotted*, than *Hanged*.

145 The *Strings* of a *Lute*, or *Violl*, or *Virginals*, doe give a farre greater *Sound*, by reason of the *Knot*, and *Board*, and *Concave* underneath, than if there were nothing but only the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the *Upper Aire* into the *Lower*. The Cause is, the *Communication* of the *Upper Aire* with the *Lower*; And *Penning* of both from *Expende*, or *Disperfing*.

146 An *Irish Harpe* hath *Open Aire* on both sides of the *Strings*: And it hath the *Concave* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more *Refounding Sound*, than a *Bandora*, *Orpharion*, or *Citterne*, which have likewise *Wire-strings*. I judge the Cause to be, for that *Open Aire* on both Sides helpeth, so that there be a *Concave*; Which is therefore best placed at the End.

147 In a *Virginall*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The Cause is, for that all *Shutting in* of *Aire*, where there is no competent Vent, dampeth the *Sound*: Which maintaieth likewise the former Instance; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* somewhat.

148 There is a *Church* at *Glocester*, (and as I have heard the like is in some other places;) where if you speak against a Wall, softly, another shall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the Frame of that Place. I suppose there is some *Vault*, or *Hollow*,

Hollow, or *Isle*, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speak; So as the *Voice* of him that speaketh, sliderh along the Wall, and then enterh at some Passage, and communicateth with the *Aire* of the *Hollow*; For it is preserved somewhat by the plaine Wall; but that is too weak to give a *Sound* Audible, till it hath communicated with the back *Aire*.

Strike upon a *Bow-string*, and lay the *Horne* of the *Bow* neare your Eare, and it will encrease the *Sound*, and make a degree of a *Tone*. The Cause is, for that the *Sensory*, by reason of the Close Holding, is percussed, before the *Aire* disperfeth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great *Entercourse* betweene those two Parts; As appeareth by this; That a harsh *grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike upon the other, it maketh a far greater *Sound*, than the like Stroke upon the *Rod*, not so made Contiguous to the Eare. By which, and by some other Instances, that have beene partly touched, it should appeare; That *Sounds* do not only slide upon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body.

I remember in *Trinity Colledge* in *Cambridge*, there was an *Upper Chamber*, which being thought weak in the Roofe of it, was supported by a Pillar of *Iron*, of the bignesse of ones Arme, in the midst of the *Chamber*; which if you had struck, it would make a little flat Noise in the *Room* where it was struck; But it would make a great *Bombe* in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *Well*, when they touch upon the *Water*; Or when they strike upon the side of the *Well*; Or when two *Buckets* dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Aire*. The Cause is the *Penning* and *Enclosure* of the *Aire*, in the *Concave* of the *Well*.

Barrels placed in a *Roome* under the *Floare* of a *Chamber*, make all *Noises* in the same *Chamber*, more full and *Refounding*.

So that there be five wayes (in generall,) of Majoration of *Sounds*: *Enclosure Simple*; *Enclosure with Dilatation*; *Communication*; *Reflexion Concurrent*; and *Approach to the Sensory*.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solid* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Close Body; and such an one, as letteth not in *Aire*. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weakenesse*, or *Exility*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Atties*, or *Eagles Stone*, which hath a little Stone within it.

And as for *Water*, it is a certaine Triall: Let a Man go into a *Bath*, and take a *Pail*, and turne the Bottom upward, and carry the Mouth of it (Even,) downe to the Levell of the *Water*, and so presse it downe under the *Water*; some handfull and an halfe, still keeping it even, that it may not tilt on either side, and so the *Aire* get out: Then let him that is in the *Bath*, dive with his Head so far under *Water*, as he may put his Head into the *Pail*, and there will come as much *Aire* bubling forth, as will make Roome for his Head. Then let him speak, and any that shall stand without, shall heare his *Voice* plainly; but yet made extreame sharp and exile, like the *Voice* of

Pappets: But yet the *Articulate Sounds* of the *Words* will not be contounded. Note that it may be much more handfomely done, if the *Paile* be put over the *Mans* head above *Water*, and then he cove downe, and the *Paile* be pressed downe with him. Note that a *Man* must kneele or sit, that he may be lower than the *Water*. A *Man* would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules's Page Hylis* went with a *Water-pot*, to fill it at a pleasant *Fountaine*, that was neare the *Shore*, and that the *Nymphs* of the *Fountaine* fell in love with the *Boy*, and pulled him under *Water*, keeping him alive; And that *Hercules* missing his *Page*, called him by his Name aloud, that all the *Shore* rang of it; And that *Hylis* from within the *Water*, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three Miles off, when the *Fountaine* (indeed) was fast by.

In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high, (whereby it hath lesse Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

Take two *Sawcers*, and strike the Edge of the one against the Bottom of the other, within a *Paile* of *Water*; And you shall finde, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; even while Part of the *Sawcer* is above the *Water*; But that Flatnesse of *Sound* is joynd with a harshnesse of *Sound*; which (no doubt is caused by the inequality of the *Sound*, which commeth from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becommeth more cleare, but far more low; And as if the *Sound* came from a far off.

A *Soft Body* dampeth the *Sound*, much more than a *Hard*: As if a *Bell* hath *Cloth*, or *Silk* wrapped about it, it deadeth the *Sound* more, than if it were *Wood*. And therefore in *Clericalls*, the *Keyes* are lined; And in *Colledges* they use to line the *Tablemen*.

Trial was made in a *Recorder*, after these severall manners. The Bottom of it was set against the *Palme* of the *Hand*; stopped with *Wax* round about, set against a *Damask Cushion*; Thrust into *Sand*; into *Ashes*; into *Water*, (halfe an *Inch* under the *Water*;) Close to the Bottom of a *Silver Basin*; And still the *Tone* remained: But the Bottom of it was set against a *Wollen Carpet*; A *Lining* of *Plush*; A *Lock* of *Wooll*, (though loosely put in;) Against *Snow*; And the sound of it was quite deaded, and but *Breath*.

Iron Hot produceth not so full a *Sound*, as when it is *Cold*; For while it is hot, it appeareth to be more *Soft*, and lesse *Resounding*. So likewise *Warne Water*, when it falleth, maketh not so full a *Sound*, as *Cold*: And I conceive it is softer, and neerer the Nature of *Oile*; For it is more slippery; As may be perceived, in that it scowreth better.

Let there be a *Recorder* made, with two *Fipples*, at each end one; The *Trunk* of it of the length of two *Recorders*, and the *Holes* answerable towards each end; And let two play the same *Lesson* upon it, at an *Unison*; And let it be noted whither the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two *Trunks* (thorowout) hollow; And let two speak, or sing, the one long wayes, the other traverse. And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also give light to the *Mixture* of *Sounds*; whereof we shall speak hereafter.

A *Bellows* blowne in at the *Mole* of a *Drum*, and the *Drum* then stricken, maketh

maketh the *Sound* a little flatter, but no other apparent Alteration. The Cause is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blowne together, lesse moveable.

The *Loudnesse*, and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly stricken, giveth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the Cause is, for that the *Base String* striketh more *Aire*; And the *Treble* lesse *Aire*, but with a sharper Percussion.

It is therefore the *Strengih* of the *Percussion*, that is a Principall Cause of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; *Winding* of a *Horne* stronger or weaker; *Ring*ing of a *Hand-bell* harder or softer, &c. And the *Strengih* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a *Cloth*, it will give a lesse *Sound*; If against *Wood*, a greater; If against *Metall*, yet a greater; And in *Metals*, if you strike against *Gold*, (which is the more pliant,) it giveth the flatter *Sound*; If against *Silver*, or *Brasse*, the more *Ring*ing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore wee see in discharging of a *Peece*, what a great *Noise* it maketh. Wee see also, that the *Charge* with *Bullet*; Or with *Paper* wet, and hard stopped; Or with *Powder* alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report.

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great Cause of the *Loudnesse*, as well as the *Strengih*: As in a *Whip* or *VVand*, if you strike the *Aire* with it; the *Sharper* and *Quicker* you strike it, the *Louder Sound* it giveth. And in playing upon the *Lute*, or *Virginally*, the quicke *Stroke* or *Touch*, is a great life to the *Sound*. The Cause is, for that the *Quicke Striking* cutteth the *Aire* speedily; whereas the *Soft Striking* doth rather beat, than cut.

The *Communication* of *Sounds* (as in *Bellies* of *Lutes*, *Empty Vessells*, &c.) hath beene touched obiter, in the *Majoration* of *Sounds*: But it is fit also to make a *Title* of it apart.

The *Experiment* for greatest Demonstration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you strike with a *Hammer* upon the *Upper Part*, and then upon the *Midst*, and then upon the *Lower*, you shall finde the *Sound* to be more *Treble*, and more *Base*, according unto the *Concave*, on the *Inside*; though the *Percussion* bee onely on the *Outside*.

When the *Sound* is created betweene the *Blast* of the *Mouth*, and the *Aire* of the *Pipe*, it hath neverthelesse some *Communication* with the *Matter* of the *Sides* of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of *Wood*, and *Brasse*, the *Sound* will be divers; So if the *Pipe* be covered with *Cloth*, or *Silke*, it will give a divers *Sound*, from that it would doe of it selfe; So, if the *Pipe* bee a little wet on the *Inside*, it will make a differing *Sound*, from the same *Pipe* dry.

That *Sound* made within *Water*, doth communicate better with a *hard Body* thorow *Water*, than made in *Aire*, it doth with *Aire*; Vide *Experimentum*, 134.

Wee have spoken before (in the *Inquisition* touching *Musicke*,) of *Musicall Sounds*, whereunto there may be a *Concord* or

Experiments in Confort touching the Loudnesse, or Softnesse of Sounds; and their Carriage at longer or shorter Distance.

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Experiments in Confort touching the Communication of Sounds.

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Experiments in Confort touching Equality, and Inequality of Sounds.

Discord in two Parts; Which Sounds we call *Tones*; And likewise of *Immuscalls* Sounds; And have given the Cause, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*. And wee have also expressed there, what are the *Equall Bodies* that give *Tones*, and what are the *Vnequall* that give none. But now we shall speake of such *Inequality* of Sounds, as proceedeth, not from the Nature of the Bodies themselves, but is Accidentall; Either from the *Roughnesse*, or *Obliquity* of the *Passage*; or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

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A *Bell*, if it have a *Rift* in it, whereby the *Sound* hath not a cleare *Passage*, giveth a *Hoarse* and *Iarring Sound*; So the *Voice* of *Man*, when by Cold taken the *Wefill* groweth rugged, and (as we call it) *furred*, becommeth hoarse. And in these two *Instances*, the *Sounds* are *Ingrate*; because they are meere *Vnequall*: But, if they be *Vnequall* in *Equality*, then the *Sound* is *Gratefull*, but *Purling*.

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All *Instruments*, that have either *Retournes*, as *Trumpets*; Or *Flexions*, as *Cones*; Or are *Drawne up*, and *pui from*, as *Sackbuts*; have a *Purling Sound*: But the *Recorder*, or *Flute*, that have none of these *Inequalities*, give a cleare *Sound*. Nevertheless, the *Recorder* it selfe, or *Pipe* moistened a little in the *Infide*, soundeth more solemnly, and with a little *Purling*, or *Hissing*. Again, a *wreathed String*, such as are in the *Base Strings* of *Bandoraes*, giveth also a *Purling Sound*.

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But a *Lute-string*, if it be meere *Vnequall* in his *Parts*, giveth a *Harsh* and *Untuneable Sound*; which *Strings* wee call *False*, being bigger in one *Place* than in another; And therefore *Wire-strings* are never *False*. Wee see also, that when we trie a *False Lute-string*, we use to extend it hard betweene the *Fingers*, and to fillip it; And if it giveth a double *Species*, it is *True*; But if it giveth a *treble*, or more, it is *False*.

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Waters, in the *Noise* they make as they runne, represent to the *Eare* a *Trembling Noise*; And in *Regals*, (where they have a *Pipe*, they call the *Nighingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall *Trembling*: And *Children* have also little Things they call *Cockes*, which have *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling* of *Water*, hath an affinity with the *Letter L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise.

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All *Base Notes*, or very *Treble Notes*, give an *Asper Sound*; For that the *Base* striketh more *Aire*, than it can well strike equally: And the *Treble* cutteth the *Aire* so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane*, or *Tenor*, is the sweetest *Part*.

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We know Nothing, that can at pleasure make a *Musical*, or *Immusical Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The Cause is, (no doubt) in the *Wefill* or *Wind-Pipe*, (which we call *Aspera Arteria*;) which being well extended, gathereth *Equality*; As a *Bladder* that is wrinckled, if it be extended, becommeth smooth. The *Extension* is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can never give a *Tone*: And in *Singing*, there is (manifestly) a greater *Working* and *Labour* of the *Throat*, than in *Speaking*; as appeareth in

in the *Turking* out, or *Drawing* in of the *Chinne*, when wee sing.

The *Humming* of *Bees*, is an *Vnequall Buzzing*; And is conceived, by some of the *Ancients*, not to come forth at their *Mouth*, but to bee an *Inward Sound*; But (it may be) it is neither; But from the *Motion* of their *Wings*; For it is not heard but when they sturre.

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All *Metalls quenched* in *Water*, give a *Sibilation* or *Hissing Sound*; (which hath an *Affinity* with the *Letter Z*;) notwithstanding the *Sound* bee created betweene the *Water* or *Vapour*, and the *Aire*. Seeing also, if there bee but small *Store* of *Water*, in a *Vessell*, giveth a *Hissing Sound*; But *Boyling* in a full *Vessell*, giveth a *Bubbling Sound*, drawing somewhat neare to the *Cocks* used by *Children*.

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Triall would be made, whether the *Inequality*, or *Interchange* of the *Medium*, will not produce an *Inequality* of *Sound*; As if three *Bells* were made one within another, and *Aire* betwixt each; And then the outermost *Bell* were chimed with a *Hammer*, how the *Sound* would differ from a *Simple Bell*. So likewise, take a *Plate* of *Brasse*, and a *Plancke* of *Wood*, and joyne them close together, and knock upon one of them, and see if they doe not give an *unequall Sound*. So make two or three *Partitions* of *Wood* in a *Hoghead*, with *Holes* or *Knots* in them; And make the difference of their *Sounds*, from the *Sound* of an *Hoghead*, without such *Partitions*.

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It is evident, that the *Percussion* of the *Greater Quantity* of *Aire*, causeth the *Basfer Sound*; And the lesse *Quantity*, the more *Treble Sound*. The *Percussion* of the *Greater Quantity* of *Aire*, is produced by the *Greatnesse* of the *Body Percussing*; By the *Latitude* of the *Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore we see that a *Base String*, is greater than a *Treble*; A *Base Pipe* hath a greater *Bore* than a *Treble*; And in *Pipes*, and the like, the lower the *Note Holes* be, and the further off from the *Mouth* of the *Pipe*, the more *Base Sound* they yeeld; And the nearer the *Mouth*, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the *Top*, it maketh a more *Treble Sound*; And at the *Bottom* a *Basfer*.

Experiments
in Comfort
touching the
more Treble,
and the more
Base Tones, or
Musical
Sounds.

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It is also evident, that the *Sharper* or *Quicker Percussion* of *Aire* causeth the more *Treble Sound*; And the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*; the more they are wound up, and strained; (And thereby give a more quick *Start-backe*;) the more *Treble* is the *Sound*; And the *Slacker* they are, or lesse wound up, the *Basfer* is the *Sound*. And therefore a *Bigger String* more strained, and a *Lesser String*, lesse strained, may fall into the same *Tone*.

179

Children, *Women*, *Eunuchs* have more small and shrill *Voyces*, than *Men*. The Reason is, not for that *Men* have greater *Heat*, which may make the *Voyce* stronger, (for the strength of a *Voyce* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the *Dilatation* of the *Organ*, which (it is true) is likewise caused by *Heat*. But the Cause of *Changing* the *Voyce*, at the yeares of *Puberty*, is more obscure. It seemeth to be, for that when much of the *Moysture* of the *Body*, which did before irrigate the *Parts*, is drawne down to the *Spermatieall* vessels; it leaveth the *Body* more hot than it was; whence cometh the *Dilatation* of the *Pipes*: For we see plainly, all Effects of *Heat*, doe then come on; As *Pilosities*, more *Roughnesse* of the *Skinne*, *Hardnesse* of the *Flesh*, &c.

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The *Industry* of the *Musitian*, hath produced two other *Meanes* of *Straining*, or *Intension* of *Strings*, besides their *Winding up*. The one is the *Stopping* of

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of the *Siring* with the *Finger*; As in the Necks of Lutes, Viols, &c. The other is the *Shortnesse* of the *Siring*; As in Harps, Virginalls, &c. Both these have one, and the same reason; For they cause the *Siring* to give a quicker Start.

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In the *Siraining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note*; For it requireth good Winding of a *String*, before it will make any *Note* at all: And in the *Stops* of Lutes, &c. the higher they goe, the lesse *Distance* is betweene the *Frets*.

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If you fill a *Drinking Glas*se with *Water*, (especially one Sharp below, and Wide above,) and fillip upon the Brim, or Out-side; And after empty Part of the *Water*, and so more and more, and still trie the *Tone* by Fillipping; you shall finde the *Tone* fall, and be more *Bafe*, as the *Glas*se is more Empty.

Experiments
in Confort
touching the
Proportion of
Treble and Base
Tones.

The Just and Measured Proportion of the *Aire Percussed*, towards the *Basenesse* or *Treblenesse* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discovereth the true Coincidence of *Tones* into *Diapasons*; Which is the Returne of the same *Sound*. And so of the *Concords* and *Discords*, between the *Vnison*, and *Diapason*; Which we have touched before, in the *Experiments* of *Musicke*; but thinke fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But most commodiously in the last of these.

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Trie therefore the *Winding* of a *String* once about, as soon as it is brought to that Extension, as will give a *Tone*; And then of twice about; And thrice about, &c. And mark the Scale or Difference of the Rise of the *Tone*: Whereby you shall discover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimension* of the *Winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will be, to take the Length in a right Line of the *String*, upon any *Winding* about of the *Pegge*.

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As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first *Stop* of the *String*, unto such a *Stop* as shall produce a *Diapason* to the former *Stop*, upon the same *String*.

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But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*: And therefore cause some halfe dozen *Pipes*, to bee made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what Fall of *Tone* every one giveth. But still in these three last *Instances*, you must diligently observe, what length of *String*, or *Distance* of *Stop*, or *Concave* of *Aire*, maketh what Rise of *Sound*. As in the last of these (which (as we said) is that, which giveth the aptest demonstration,) you must set downe what Encrease of *Concave* goeth to the making of a *Note* higher, And what of two *Notes*; And what of three *Notes*; And so up to the *Diapason*: For then the great Secret of *Numbers* and *Proportions*, will appeare. It is not unlike, that those that make *Recorders*, &c. know this already: for that they make them in *Seis*. And likewise *Bell-founders* in fitting the

the tune of their *Bells*. So that Enquiry may save Truall. Surely, it hath been observed by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapason* to the *Sound* of the like *Barrell* full; But how that should be, I doe not well understand; For that the knocking of a *Barrell*, full or *Empty*, doth scarce give any *Tone*.

There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the *Passive*: And that it bee not too neare, but at a distance. For in a *Recorder*, the three uppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the *Winding* or *Stopping* of *Strings*.

There is another Difference of *Sounds*, which wee will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Bafe*, nor *Treble*: Nor it is not *Musicall*, nor *Immusicall*: Though it bee true, that there can bee no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may bee both *Musicall* and *Immusicall*. Wee shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that wee meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elison* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can never make a *Tone*, nor sing in *Whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellows*, or *Wind*, (though lowd) is an *Interiour Sound*; But the *Blowing* thorough a *Pipe*, or *Concave*, (though soft) is an *Exteriour*. So likewise the greatest *Winds*, if they have no Coarctation, or blow not hollow, give an *Interiour Sound*; The *Whistling* or hollow *wind* yeeldeth a *Singing*, or *Exteriour Sound*; The former being pent by some other *Body*; The later being pent in by his own *Densitie*: And therefore we see, that when the *Wind* bloweth hollow, it is a *Signe* of *Raine*. The *Flame*, as it moveth within it selfe, or is blowne by a *Bellows*, giveth a *Murmur* or *Interiour Sound*.

There is no *Hard Body*, but stricke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: In so much as if the *Percussion* be over-soft, it may induce a *Nullity* of *Sound*; But never an *Interiour Sound*; As when one treadeth so softly, that hee is not heard.

Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it never giveth an *Exteriour Sound*; As if you blow strongly with a *Bellows* against a *Wall*.

Sounds (both *Exteriour* and *Interiour*,) may be made, as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

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Experiments
in Confort
touching Ex-
teriour, and In-
teriour, Sounds

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It

It is evident, and it is one of the strangest Secrets in Sounds, that the whole Sound is not in the whole Aire onely; But the whole Sound is also in every small Part of the Aire. So that all the curious Diverfitie of Articulate Sounds, of the Voyce of Man, or Birds, will enter at a small Cranny, Inconfused.

The Unequal Agitation of the Winds, and the like, though they be materiall to the Carriage of the Sounds, further or lesse way; yet they doe not confound the Articulation of them at all, within that distance that they can be heard; Though it may be, they make them to be heard lesse Way, than in a Still; as hath beene partly touched.

Over-great Distance confoundeth the Articulation of Sounds; As we see, that you may heare the Sound of a Preachers voyce, or the like, when you cannot distinguish what he saith. And one Articulate Sound will confound another; as when many speake at once.

In the Experiments of Speaking under Water, when the Voyce is reduced to such an Extreme Exilitie, yet the Articulate Sounds, (which are the Words) are not confounded; as hath beene said.

I conceive, that an Extreme Small, or an Extreme Great Sound, cannot be Articulate; But that the Articulation requireth a Mediocrity of Sound: For that the Extreme Small Sound confoundeth the Articulation by Contrasting; And the Great Sound, by Dispersing: And although (as was formerly said) a Sound Articulate, already created, will be contracted into a small Cranny; yet the first Articulation requireth more Dimension.

It hath beene observed, that in a Roome, or in a Chappell, Vaulted below, and Vaulted likewise in the Roofe, a Preacher cannot be heard so well, as in the like Places not so Vaulted. The Cause is, for that the Subsequent Words come on, before the Precedent Words vanish: And therefore the Articulate Sounds are more confused, though the Groffe of the Sound be greater.

The Motions of the Tongue, Lips, Throat, Palate, &c. which goe to the Making of the severall Alphabetical Letters, are worthy Enquiry, and pertinent to the present Inquisition of Sounds: But because they are subtill, and long to describe, we will referre them over, and place them amongst the Experiments of Speech. The Hebrewes have beene diligent in it, and have assigned, which Letters are Labiall, which Dental, which Gutturall, &c. As for the Latines, and Grecians, they have distinguished betweene Semi-vowels, and Vowels; And in Musick, betweene Musick Tenues, Mediae, and Aspirate; Not amiss. But yet not diligently enough. For the speciall Stroakes, and Motions, that create these Sounds, they have little enquired: As that the Letters, B, P, F, M. are not expressed, but with the Contrasting, or Shutting of the Mouth; That the Letters, N and B. cannot be pronounced, but that the Letter, N. will turne into M. As Hecatomba, will be Hecatomba. That M. and T. cannot be pronounced together; but P. will come betweene; as *Emptum* is pronounced *Esptum*; And a Number of the like. So that if you enquire to the full, you will finde, that to the Making of the whole Alphabet, there will be fewer Simple Motions required, than there are Letters.

The Lungs are the most Spongy Part of the Body; And therefore apt to contract, and dilate it selfe; And where it contracteth it selfe, it expelleth the Aire; which thorow the *Apyre*, Throat, and Mouth, maketh the Voyce: But yet Articulation is not made, but with the

the helpe of the Tongue, Palate, and the rest of those they call Instruments of voyce.

There is found a Similitude, betweene the Sound that is made by Inanimate Bodies, or by Animate Bodies, that have no Voyce Articulate; and divers Letters of Articulate Voyces: And commonly Men have given such Names to those Sounds, as doe allude unto the Articulate Letters. As Trembling of Water hath Resemblance with the Letter L; Quenching of Hot Metalls, with the Letter Z; Snarling of Dogs, with the Letter R; The Noise of Scritch-Owles; with the Letter Sh; Voyce of Cass, with the Diphthong Eu; Voyce of Cuckoos, with the Diphthong Ou; Sounds of Strings, with the Letter Ng: So that if a Man, (for Curiosity, or Strangenesse sake,) would make a Puppet or other Dead Body, to pronounce a Word; Let him consider, on the one Part, the Motion of the Instruments of Voyce; and on the other part the like Sounds made in Inanimate Bodies; And what Conformitie there is that causeth the Similitude of Sounds; And by that he may minister light to that Effect.

NA-



NATVRALL HISTORIE.

III. Century.



ALL Sounds (whatsoever) move Round; That is to say; On all Sides; Upwards; Downwards; Forwards; and Backwards. This appeareth in all Instances.

Sounds doe not require to be conveyed to the Sense, in a Right Line, as Visibles doe, but may bee Arched; Though it be true, they move strongest in a Right Line; Which nevertheless is not caused by the Rightnesse of the Line, but by the Shortnesse of the distance; *Linea recta brevissima*. And therefore we see, if a Wall be betweene, and you speake on the one Side, you heare it on the other; Which is not because the Sound Passeth thorow the Wall; but Archeth over the Wall.

If the Sound be Stopped and Repercussed, it cometh about on the other Side, in an Oblique Line. So, if in a Coach, one side of the Boot bee downe, and the other up; And a Begger beg on the Close Side; you would thinke that he were on the Open Side. So likewise, if a Bell or Clock, bee (for Example) on the North-side of a Chamber; And the Window of that Chamber be upon the South; Hee that is in the Chamber will thinke the Sound came from the South.

Sounds, though they spread round, (so that there is an Orbe, or Sphericall Area of the Sound;) yet they move strongest, and goe furthest in the Fore-Lines, from the first Locall Impulsion of the Aire. And therefore in Preaching, you shall heare the Preachers Voyce, better, before the Pulpit, than behind it, or on the Sides, though it stand open. So a Harquebuz, or Ordinance, will bee further heard, forwards, from the Mouth of the Peece, than backwards, or on the Sides.

It may be doubted, that Sounds doe move better Downwards, than Upwards. Pulpits are placed high above the People. And when the Ancient Generalls spake to their Armies, they had ever a Mount of Turfe cast up, whereupon they stood: But this may be imputed to the Stops and Obstacles, which the voyce meeteth with, when one speaketh upon the levell. But

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in Confort,
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Motions of
Sounds, in
what Lines
they are
Circular, Ob-
lique, Straight;
Upwards,
downwards;
Forwards;
Backwards.

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there seemeth to be more in it: For it may be, that *Spirituall Spices*, both of *Things Visible* and *Sounds*, doe move better *Downwards* than *Upwards*. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pails, seem much lesse than they are, and cannot be knowne; But to Men above, those below seeme nothing so much lessened, and may be knowne: yet it is true, that all things to them above, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Upper window, or Tarras.

But to make an exact Triall of it, let a Man stand in a *Chamber*, not much above the Ground, and speake out at the window, thorow a *Trunke*, to one standing on the Ground, as softly as he can, the other laying his Eare close to the *Trunke*. Then *vice versa*, let the other speake below keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Truncke*. And this may be the best Meanes, to make a Judgement, whether *Sounds* descend, or ascend, better.

After that *Sound* is created, (which is in a moment,) wee finde it continueth some small time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to bee a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renovation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String stricken, which is thought to be a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a *Virginal*, as soone as ever the Jacke falleth, and toucheth the String, the *Sound* ceaseth; And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish that there are two *Trepidations*: The one Manifest, and Local; As of the Bell, when it is *Pensile*: The other Secret, of the *Minute Parts*, such as is described in the ninth Instance. But it is true, that the *Local* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while, after you have played; But that is but while the Bellows are in falling.

It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will be carried, (at the least) twenty Miles upon the land, and much further upon the Water. But then it will come to the Eare, Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the First *Sound*, For there is no *Trepidation* which should renew it. And the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more then Momentary.

To try exactly the time wherein *Sound* is *Delayed*, Let a Man stand in a Steeple, and have with him a Taper, And let some vaile be put before the Taper; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same instant withdraw the Vaile; And so let him in the Field tell by his Pulse what distance of Time there is betwene the *Light* scene, and the *Sound* heard: For it is certaine that the *Delay* of *Light* is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

It is generally knowne and observed, that *Light*, and the *Object* of *Sight*, move faster than *Sound*; For we see the *Flash* of a Pece is seene sooner, than

than the *Noise* is heard. And in Hewing Wood, if one be some distance off, he shall see the Arme lifted up for a second Stroke, before he heare the *Noise* of the first. And the greater the Distance, the greater is the Prevention: As we see in Thunder, which is farre off; where the Lightning precedeth the Crack a good space.

Colours, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same Strength; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Local Motion*, of the *Aire*; (as a Cause *Sine qua non*,) in that, it perisheth so suddenly; For in every Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it self, which the *Water* also doth, but nothing so swiftly.

In the Trials of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing* *By the sides* of a Body, for the *Passing* *thorow* a Body: and therefore you must make the *Intercepting* Body very close; For *Sound* will passe thorow a small Chinck.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; thorow a *Wall*; thorow *Metal*, as in Hawkes Bels stopped, &c.) the *Hard*, or *Close Body*, must be but thinne and small; For else it deaderth and extinguisheth the *Sound* utterly. And therefore, in the *Experiment of Speaking in Aire under Water*, the voice must not be very deepe within the *Water*: For then the *Sound* pierceth not. So if you speak on the further side of a *Close Wall*, if the *Wall* be very thick, you shall not be heard: And if there were an Hoghead, empty, whereof the Sides were some two Foot thick, and the Bung hole stopped; I conceive the Resounding *Sound*, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none: But only you shall heare the *Noise* of the *Outward Knock*, as if the Vessell were full.

It is certaine, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the *Hard body* it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are struck, than when the *Percussion* is only within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped up, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax, and then shake the Glasse, and see whether the Bell give any *Sound* at all, or how weak: But note, that you must in stead of the Threed, take a Wire; or else let the Glasse have a great Belly; lest when you shake the Bell, it dash upon the Sides of the Glasse.

It is plaine, that a very *Long* and *Downe-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard over a Wall, will not be heard over a Church; Nor that *Sound*, which will be heard, if you stand some distance from the Wall, will be heard if you stand close under the Wall.

Soft and *Foraminous Bodies*, in the first Creation of the *Sound*, will dead it; For the striking against Cloth, or Furre, will make little *Sound*: As hath bene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*: As we see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse windowes, if they be very Close, will check a

Experiments in Confort, touching the Lasting and Perishing of Sound; And touching the Time they require to their Generation, or Duration.

Experiments in Confort touching the Passage and Interceptions of Sounds.

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Sound more, than the like Thickness of Cloth. We see also, in the Rumbling of the Belly, how easily the Sound passeth thorow the Guts, and Skin.

It is worthy the Enquiry, whether Great Sounds, (As of Ordnance, or Bells) become not more Weak and Exile, when they passethorow Small Crannies. For the Subtilties of Articulate Sounds, (it may be) may passe thorow Small Crannies, not confused; But the Magnitude of the Sound (perhaps) not so well.

Experiments
in Confort,
touching the
Medium of
Sound.

The Mediums of Sounds are Air; Soft and Porous Bodies; Also Water. And Hard Bodies refuse not altogether to be Mediums of Sounds. But all of them are dull and unapt Deferents, except the Air.

In Air, the Thinner or Drier Air, carrieth not the Sound so well, as the more Dense; As appeareth in Night Sounds; And Evening Sounds; And Sounds in moist Weather, and Southerne Winds. The reason is already mentioned in the Title of Majoration of Sounds; Being for that Thin Air is better pierced; but Thick Air preserveth the Sound better from Waste; Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the Sound.

How farre forth Flame may be a Medium of Sounds, (especially of such Sounds as are created by Air, and not betwixt Hard Bodies) let it be tried, in Speaking where a Bonfire is betwene; But then you must allow for some disturbance, the Noise that the Flame it selfe maketh.

Whether any other Liquoris, being made Mediums, cause a diversity of Sound from water, it may be tried: As by the Knapping of the Tonges; Or Spitting the Bottom of a Vessell, filled either with Milk, or with Oile; which though they be more light, yet are they more unequal Bodies than Air.

Of the Natures of the Mediums, we have now spoken; As for the Disposition of the said Mediums, in what consist in the Penning, or not Penning of the Air; Of which we have spoken before, in the Title of Delation of Sounds: It consisteth in the Figure of the Concave, through which it passeth; Of which we will speak next.

How the Figures of Pipes, or Concaves, through which Sounds passe; Or of other Bodies deferent; conduce to the variety and Alteration of the Sounds; Either in respect of the Greater Quantity, or lesse Quantity of Air, which the Concaves receive; Or in respect of the Carrying of Sounds longer or shorter way; Or in respect of many other Circumstances; they have beene touched, as falling into other Titles. But those Figures, which we now are to speak of, we intend to be, as they concerne the Lines, through which Sound passeth; As Straight; Crooked; Angular; Circular; &c.

The Figure of a Bell parteth of the Pyramid, but yet comming off, and distilling more suddenly. The Figure of a Hunters Horn, and Cornet, is oblique; yet they have likewise Straight Hornes, which if they be of the same Bore with the Oblique, differ little in Sound: save that the Straight require a stronger Blast. The Figures of Recorders, and Flutes, and Pipes are likewise oblique. But the Recorder hath a lesse Bore, and a greater; Above, and below. The Trumpet hath the Figure of the Letter S: which maketh that

Purling

Purling Sound, &c. Generally, the Straight Line hath the cleaneft and roundest Sound, And the Crooked the more Hoarse, and Jarring.

Of a Sinuous pipe, that may have some foure Flexions, Triall would be made. Likewise of a Pipe, made like a Crosse, open in the midst. And so likewise of an Angular Pipe: And see what will be the Effects of these severall Sounds. And so againe of a Circular Pipe; As if you take a Pipe perfect Round, and make a Hole whereinto you shall blow, And another Hole not farre from that; But with a Traverse or Stop between them; So that your Breath may goe the Round of the Circle, and come forth at the second Hole. You may trie likewise Percussions of Solid Bodies of severall Figures; As Globes, Flats, Cubes, Crosses, Triangles, &c. And their Combinations; As Flat against Flat; And Convex against Convex; And Convex against Flat, &c. And mark well the diversities of the Sounds. Trie also the difference in Sound of severall Crassitudes of Hard Bodies percussed; And take knowledge of the diversities of the Sounds. I my selfe have tried, that a Bell of Gold yeeldeth an excellent Sound, not inferior to that of Silver, or Brasse, but rather better: yet we see that a piece of Money of Gold soundeth farre more flat than a peece of Money of Silver.

The Harpe hath the Concave, not along the Strings, but across the Strings; And no Instrument hath the Sound so Melting, and Prolonged, as the Irish Harpe. So as I suppose, that if a Virginal were made with a double Concave; the one all the length as the Virginal hath; the other at the End of the Strings, as the Harpe hath; It must needs make the Sound perfecter, and not so Shallow, and Jarring. You may trie it, without any Sound-Board along, but onely Harp-wise, at one End of the Strings: Or lastly with a double Concave, at Each end of the Strings one.

There is an apparent Diversitie between the Species Visible and Audible, in this; That the Visible doth not mingle in the Medium, but the Audible doth. For if we looke abroad, we see Heaven, a number of Starres, Trees, Hills, Men, Beasts, at once. And the Species of the one doth not confound the other. But if so many Sounds come from severall Parts, one of them would utterly confound the other. So we see, that Voyces or Consorts of Musick doe make an Harmony by Mixture, which Colours doe not. It is true nevertheless, that a great Light drowneth a smaller, that it cannot be seene; As the Sunne that of a Gloworme, as well as a Great Sound drowneth a lesser. And I suppose likewise, that if there were two Lanthornes of Glasse, the one a Crimson, and the other an Azure, and a Candle within either of them, those Coloured Lights would mingle and cast upon a White Paper a Purple Colour. And even in Colours, they yeeld a faint and weak Mixture: For white walls make Roomes more light some than black, &c. But the Cause of the Confusion in Sounds, and the Inconfusion in Species Visible, is, For that the Sight worketh in Right Lines, and maketh severall Cones; And so there can be no Coincidence in the Eye, or Visuall Point: But Sounds, that move in Oblique and Arcuate Lines, must needs encounter, and disturbe the one the other.

The sweetest and best Harmony is, when every Part, or Instrument, is not heard by it selfe, but a Conflation of them all; Which requireth to stand some distance off. Even as it is in the Mixture of Perfumes; Or the Taking of the Smells of severall Flowers in the Air.

The Diffusion of the Air, in other Qualities, except it be joyned with Sound, hath no great Operation upon Sounds: For whether the Air be

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light some

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Sounds.

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lightsome or darke, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

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But *Sounds* doe disturb and alter the one the other: Sometimes the one drowning the other, and making it not heard, Sometimes the one jarring and disordring with the other, and making a Confusion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

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Two *Voices* of like lowdnesse, will not be heard, twice as farre, as one of them alone; And two *Candles* of like light, will not make Things seeme twice as farre off, as one. The Cause is profound; But it seemeth that the Impressions from the *Objects* of the Senses, doe mingle respectively, every one with his kinde; But not in proportion, as is before demonstrated: And the reason may be, because the first *Impression*, which is from *Privative* to *Active*, (As from *Silence* to *Noise*, or from *Darknesse* to *Light*,) is a greater Degree, than from *Lesse Noise* to *More Noise*, or from *Lesse Light* to *More Light*. And the Reason of that againe may be, For that the *Aire*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be handled by it selfe.

Experiments
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Function of
Sounds.

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All *Reflexions* Concurrant doe make *Sounds* Greater; But if the Body that createth, either the Originall *Sound*, or the *Reflexion*, be clean and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of polished *Brasse*, in stead of Wood. We see that even in the Open *Aire*, the *Wire String* is sweeter, than the *String* of *Guts*. And we see that for *Reflexion*, *Water* excelleth; As in *Musick* near the *Water*; Or in *Echo's*.

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It hath beene tried, that a *Pipe* a little moistned on the inside, but yet To as there be no Drops left, maketh a more solemne *Sound*, than if the *Pipe* were dry: But yet with a sweet Degree of *Sibilation*, or *Purling*; As we touched in before in the title of *Equality*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) between drie and wet, become a little more Eden and Smooth; But the *Purling*, (which must needs proceed of Inequality,) I take to be bred between the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the Wood of the *Pipe*, unto which the *Water* cometh not, but it remaineth drie.

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In *Frosty Weather*, *Musick* within doth soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the Wood or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow: And we see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute Strings* that have been kept long.

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Sound is likewise Meliorated by the Mingling of Open *Aire* with *Pen-Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot over the Strings; yet so, as there bee Room enough for the Strings, and Room enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concave on both Sides; whereas it useth to have it but on one Side. The doubt may be, lest it should make too much Refounding, whereby one Note would overtake another.

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If you sing in the Hole of a *Drum*, it maketh the *Singing* more sweet. And if you conceive it would, if it were a Song in Parts, sung into severall *Drums*; And if you hand it selfe, and sing in the same like, it would not be amiss to have a Confort between the Place where the *Drums* are, and the *Hearts*.

When

When a *Sound* is created in a *Wind Instrument*, between the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it meliorateth the *Sound*. For (no doubt) there would be a differing *Sound* in a *Trumpet*, or *Pipe of Wood*; And again in a *Trumpet* or *Pipe of Brasse*. It were good to trie *Recorders* & *Hunters Hornes* of *Brasse*, what the *Sound* would be.

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Sounds are meliorated by the Intension of the *Sense*, where the *Common Sense* is collected most, to the particular *Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blinde Men, than to Others: And it is manifest, that betweene *Sleeping* and *waking*, (when all the *Senses* are bound and suspended) *Musick* is farre sweeter, than when one is fully *waking*.

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It is a Thing strange in Nature, when it is attentively considered; How *Children*, and some *Birds*, learne to imitate *Speech*. They take no Marke (at all) of the Motion of the Mouth of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man think (though this which we shall say may seeme exceeding strange) that there is some Transmission of *Spirits*; and that the *Spirits* of the Teacher put in Motion, should worke with the *Spirits* of the Learner, a Pre-disposition to offer to *Imitate*, And so to perfect the *Imitation* by degrees. But touching Operations by Transmissions of *Spirits*, (which is one of the highest secrets in Nature,) we shall speake in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a pre-disposition to *Imitate*. We see how ready Apes and Monkeys are, to imitate all Motions of Man: And in the Catching of *Dortrels*, we see, how the Foolish Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but he learneth, ere he is aware, some Gesture, or Voice, or Fashion of the other.

Experiments
in Confort,
touching the
Imitation of
Sounds.

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In *Imitation of Sounds*, that Man should be the Teacher, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, given them for the *Imitation*; And besides, you shall have *Parrots*, that will not onely imitate *Voices*, but *Laughing*, *Knocking*, *Squeaking* of a Doore upon the Hinges, or of a Cart-wheele; And (in effect) any other *Noise* they heare.

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No Beast can imitate the *Speech* of Man, but *Birds* onely; For the Ape it selfe, that is so ready to imitate otherwise, attaineth not any degree of *Imitation* of *Speech*. It is true, that I have known a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of Beasts, to imitate the *Speech* of Man, may be further enquired. We see that Beasts have those Parts, which they count the Instruments of *Speech*, (as *Lips*, *Teeth*, &c.) liker unto Man, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many Beasts have it, for the Length, as much as *Birds*. What better Gorge, or Attire, *Birds* have, may be further enquired. The *Birds* that are knowne to be Speakers, are, *Parrats*, *Pyes*, *Jays*, *Dawes*, and *Ravens*. Of which *Parrats* have an aduantage Bill, but the rest not.

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But I conceive, that the Aptnesse of *Birds*, is not so much in the Confort of the Organs of *Speech*, as in their Attention. For *Speech* must come by

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Hearing,

Hearing and Hearing; And *Birds* give more heed, and make *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and praise them more. As *Applauders* in their *Singing*. We see also, that those that teach *Birds* to sing, do keep them *Waking* to increase their *Attention*. We see also, that *Birds*, amongst *Singing Birds*, are ever the better *Singers*; which may be, because they are more lively, and listen more.

Labour, and Intention to imitate *Voyces*, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the *Voyces* of *Players* of *Emetudes*, so to life, as if you see them not, you would think they were those *Players* themselves; And so the *Voyces* of other *Men* that they hear.

There have beene some, that could counterfeit the *Distance* of *Voices*, (which is a *Secondary Object* of *Hearing*;) in such sort; As when they stand far by you, you would think the *Speech* came from a farre off, in a fearfull manner. How this is done, may be further enquired. But I see no great use of it, but for *Imposition*, in counterfeiting *Ghosts* or *Spirits*.

There be three *Kindes* of *Reflexions* of *Sounds*; A *Reflexion* *Concurrent*; A *Reflexion* *Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the first hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speak of.

The *Reflexion* of *Species* of *Sounds*, by *Mirrors*, you may command; Because *Reflexions* of *Light*, since they may be guided to any point: But the *Reflexion* of *Sounds* at hard on *matter*, because the *Sound* filling great *Spaces* in *Attached Lines*, cannot be so guided: And therefore we see there hath not beene practised, any *Means* to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow *Roome*.

The *Natural Eccho's* are made upon *Walls*, *Woods*, *Rocks*, *Hills*, and *Bankes*, As for *Waters*, beinge cleare, they make a *Concurrent Eccho*; but beinge further off, as upon a large *River*, they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the *Quicknesse*, or *Slownesse* of the *Returne*. But there is no doubt, but *Water* doth helpe the *Delation* of *Beats*, as well as it helpe the *Delation* of *Originall Sounds*.

In certaine, (as hath beene formerly touched,) that if you speake thorough a *Trunke*, stopped at the further end, you shall finde a *Beat* returne upon your *Mouth*, but no *Sound* at all. The *Cause* is, for that the *Closetnesse*, which preserveth the *Originall*, is not able to preserve the *Reflected Sound*: Besides that *Beats* in a *feld* are created by *loud Sounds*. And therefore there is little hope of *Artificiall Beats* in *Aire*; pent in a narrow *Concave*. Nevertheless it hath bin tried, that our learninge over a *Well*, of 25. Farthome deep, and speakinge through a *Trunke*, that is so full as a *whisper*, the *Water* returned a good *Audible Beat*. It would be tried, whether *Speaking* in *Caves*, where there is no *Moisture*, where you speak, will not yeild *Eccho's*, as *Wells* doe.

The *Eccho* commeth as the *Originall Sound* doth, in a round *Orbe* of *Aire*: As is good to try the *Craving* of the *Eccho*, when the *Body* *Repercussing* is in an *Angle*. As against the *Returne* of a *Wall*, &c. Allowe see that in *Mirrors*, there is the like *Angle* of *Incidence*, from the *Object* to the *Reflection* from the *Glasse* to the *Eye*. And if you like a *Ball* slide long not followe the *Surface*, the *Rebound* will be as much the contrary way; Where

ther there be any such *Reflexion* in *Eccho's*, (that is, whether a *Man* shall heare better, if he stand aside the *Body* *Repercussing*, than if he stand where he speaketh, or any where in a right *Line* betweene;) may be tried. Triall likewise would be made, by *Stranding* nearer the place of *Repercussing*, than he that speaketh; And againe by *Standing* further off, than he that speaketh; And so knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not strongest neare hand.

There be many *Places*, where you shall heare a number of *Eccho's* one after another: And it is, when there is *Variety* of *Hills* or *Woods*, some nearer, some further off: So that the *Returne* from the further, beinge last created, will be likewise last heard.

As the *Voice* goeth round, as well towards the *Back*, as towards the *Front* of him that speaketh; So likewise doth the *Eccho*; For you have many *Back-Eccho's* to the *Place* where you stand.

To make an *Eccho*, that will report, three, or foure, or five *Words*, distinctly, it is requisite, that the *Body* *Repercussing*, be a good distance off: For if it be neare, and yet not so neare, as to make a *Concurrent Eccho*, it choppeeth with you upon the sudden. It is requisite likewise, that the *Aire* be not much *pent*. For *Aire*, at a great distance, *pent*, worketh the same effect with *Aire*, at large, in a small distance. And therefore in the *Triall* of *Speaking* in the *well*, though the *well* was deepe, the *Voice* came back, suddenly; And would beare the *Report* but of two *Words*.

For *Eccho's* upon *Eccho's*, there is a rare *Instance* thereof in a *Place*, which I will now exactly describe. It is some three or foure *Miles* from *Paris*, neare a *Towne* called *Pont-Charemon*; And some *Bird-bolt* shot, or more, from the *River* of *Seine*. The *Roome* is a *Chappell*, or small *Church*. The *Walls* all standing, both at the *Sides*, and at the *Ends*. Two *Rowes* of *Pillars*, after the manner of *Isles* of *Churches*, also standing; The *Roofe* all open, not so much as any *Embowment* neere any of the *walls* left. There was against every *Pillar*, a *Stack* of *Billets*, above a *Mans* *Height*, which the *Watermen*, that bring *Wood* downe the *Seine*, in *Stacks*, and not in *Boats*, laid there (as it seemeth) for their ease. Speaking at the one *End*, I did heare it returne the *Voice* thirteene severall times; And I have heard of others, that it would returne sixteene times: For I was there about three of the *Glock* in the afternoon: And it is best, (as all other *Eccho's* are) in the *Evening*. It is manifest, that it is not *Eccho's* from severall places, but a *Tossing* of the *Voyce*, as a *Ball*, to and fro; Like to *Reflexions* in *Looking-glasses*; where if you place one *Glasse* before, and another behinde, you shall see the *Glasse* behinde with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and divers such *Super-Reflexions*, till the *Species Speciei* at last die. For it is every *Returne* weaker, and more shady. In like manner, the *Voice* in that *Chappell*, createth *Speciem Speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you speake three *Words*, it will (perhaps) some three times report you the whole three *Words*; And then the two latter *Words* for some times; And then the last *Word* alone for sometimes; Still fading, and growing weaker. And whereas in *Eccho's* of one *Returne*, it is much to heare foure or five *Words*; In this *Eccho* of so many *Returnes*, upon the matter, you heare above twenty *Words* for three.

The like *Eccho* upon *Eccho*, but only with two *Reports*, hath beene observed to be, if you stand betweene a *House*, and a *Hill*, and lye towards the

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Difference
between Visible
and Audible.

Hill. For the *Houſe* will give a *Back-Echo*; One taking it from the other, and the latter the weaker.

There are certain *Letters*, that an *Echo* will hardly expreſſe; As *S*, for one, Eſpecially being Principall in a Word. I remember well, that when I was at the *Etiquet* *Pont-Charremon*; there was an Old *Parifia*; that took it to be the Work of Spirits, and of good Spirits. For, (ſaid he) call *Satan*, and the *Echo* will not deliver backe the Devils name; But will ſay, *Paſſe*, which is as much in French, as *Apas*, or *Avoid*. And thereby I did hapen finde, that an *Echo* would not returne *S*, being but a Hiſſing and a *ſcurriour* Sound.

Echo's are ſome more ſudden, and chop againe, as ſoone as the *Voice* is delivered; As hath beene partly ſaid: Others are more deliberate, that ſeem to give more Space betweene the *Voſet*, and the *Echo*; which is cauſed by the local Neareſſe, or Diſtance: Some will report a longer Traine of Words; And ſome a ſhorter: Some, more loud (full as loud as the *Originall*, and ſometimes more loud;) And ſome weaker and fainter.

Where *Echo's* come from ſeverall Parts, at the ſame diſtance, they muſt needs make (as it were) a *Quire* of *Echo's*, and ſo make the Report greater, and even a *Continued Echo*; which you ſhall find in ſome *Hills*, that ſtand encompassed, Theatre-like.

It doth not yet appeare, that there is *Refraction* in Sounds, as well as in *Species Viſible*. For I doe not thinke, that if a Sound, ſhould paſſe through di-
verſe *Mediums*, (as *Aire*, *Glaſſ*, *Wood*) it would deliver the Sound, in a differing Place, from that unto which it is directed; which is the Proper Effect of *Refraction*. But *Majoration* which is alſo the Work of *Refraction*, appeareth plainly in Sounds, (as hath beene handled at full;) But it is not by *Diverſitie* of *Mediums*.

We have obſerved, for Demonſtrations ſake, uſed in divers Inſtances, the Examples of the *Sight*, and *Things Viſible*, to illuſtrate the Nature of Sounds. But we thinke good now to proſecute that *Compariſon* more fully.

CONSENT OF VISIBLES and Audibles.

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Both of them ſpread themſelves in Round, and fill a whole Floare or Orbe, unto certaine Limits; And are carried a great way: And do languish and ſicken by degrees, according to the Diſtance of the objects from the *Sentories*.

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Both of them have the whole Species in every ſmall portion of the *Aire* or *Medium*. So as the ſpecies doe paſſe through ſmall Crannies, without Confuſion; As we ſee ordinarily in *Lens*, as to the Eye; And in *Cranes*, or *Chinks*, as to the Sound.

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Both of them are of a ſudden and eaſie Generation and Deſtruction; And likewiſe ſudden, and ſuddenly, As if you remove the Light, Or touch the Bodies that ſend the Sound.

Both of them doe receive and carry exquisite and accurate Differences; As of Colours, Figures, Motions, Diſtances, in *Viſibles*; And of Articulate Voices, Tones, Songs, and Quaverings, in *Audibles*.

Both of them in their Vertue and Working, do not appeare to emit any Corporall Subſtance into their *Mediums*, or the Orbe of their Vertue; Neither again to riſe or ſtine any evident local Motion in their *Mediums*, as they paſſe; But only to carry certaine *Spiritual Species*; The perfeſt knowledge of the Cauſe whereof, being hitherto ſcarcely attained, we ſhall ſearch and handle in due place.

Both of them ſeeme not to generate or produce any other Effect in Nature, but ſuch as appertaineth to their proper Objects, and Senſes, and are otherwiſe Barren.

But Both of them in their owne proper Action, doe worke three manifeſt Effects. The Firſt, in that the Stronger Species drowneth the Leſſer; As the Light of the Sun, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an Object of Surcharge or Exceſſe deſtroieth the Senſe; As the Light of the Sunne the Eye, a violent Sound (neare the Eare) the Hearing: The Third, in that both of them will be reverberate; As in *Mirrors*; And in *Echo's*.

Neither of them doth deſtroy or hinder the Species of the other, although they encounter in the ſame Medium; As Light or Colour hinder not Sound; Nor *contra*.

Both of them affect the Senſe in Living Creatures, and yeeld Objects of Pleaſure and Diſlike: Yet nevertheleſſe, the Objects of them doe alſo (if it be well obſerved) affect and worke upon dead Things; Namely ſuch, as have ſome Conformity with the Organs of the two Senſes; As *Viſibles* worke upon a Looking-glaſſe, which is like the Pupill of the Eye; And *Audibles* upon the Places of *Echo*, which reſemble, in ſome ſort, the Caverne and ſtructure of the Eare.

Both of them do diverſly worke, as they have their Medium diverſly diſpoſed. So a Trembling Medium (as Smoake) maketh the Object ſeeme to tremble; and a Riſing or Falling Medium (as Winds) maketh the Sounds to riſe, or fall.

To Both, the Medium, which is the moſt Propitious and Conducibile, is *Aire*; For Glaſſe or Water, &c. are not comparable.

In Both of them, where the object is Fine and Accurate, it conduceth much to have the Senſe Intenſive, and Erect; In ſo much as you contract your Eye, when you would ſee ſharply; And erect your Eare, when you would heare attentively; which in Beaſts that have Eares moveable, is moſt manifeſt.

The Beames of Light, when they are multiplied, and conglomerate, generate Heat; which is a different Action, from the Action of *Sight*: And the Multiplication and Conglomeration of Sounds doth generate an extreme Rarefaction of the *Aire*; which is an Action materiate, differing from the Action of Sound; If it be true (which is anciently reported) that Birds, with great ſhouts, have fallen downe.

DIS-

DISSENTS OF VISIBLES and Audibles.

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The Species of *Visibles* seeme to be *Emissions* of Beames from the Object seen; Almost like Odours, save that they are more Incorporeall: But the Species of *Audibles* seeme to Participate more with *Locall Motion*, like percussions, or Impressions made upon the *Aire*. So that whereas all Bodies doe seeme to worke in two manners; Either by the Communication of their Natures; Or by the Impressions and Signatures of their Motions; The Diffusion of Species *Visible* seemeth to participate more of the former Operation; and the Species *Audible* of the latter.

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The Species of *Audibles* seeme to be carried more manifestly thorow the *Aire*, than the Species of *Visibles*: For (I conceive) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

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There is one Difference, above all others, betweene *Visibles* and *Audibles*, that is the most remarkable; as that whereupon many smaller Differences doe depend: Namely; that *Visibles*, (except *Lights*,) are carried in *Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies be cleare, and the Pores in a *Right Line*, as in *Glasse*, *Chrystall*, *Diamonds*, *Water*, &c. But a thin Scarfe, or Handkerchiefe, though they be Bodies nothing so solid, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but solid Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the Reflexion of *Visibles*, small Glasses suffice; but to the Reverberation of *Audibles*, are required greater Spaces, as hath likewise beene said before.

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Visibles are seene further off, than *Sounds* are heard; Allowing nevertheless the Rate of their Bignesse: For otherwise a great Sound will be heard further off, than a Small Body seene.

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Visibles require (generally) some Distance betweene the Object, and the Eye, to be better seene; Whereas in *Audibles*, the nearer the Approach of the Sound is to the Sense, the better. But in this there may be a double Error. The one because to seeing, there is required *Light*; And any thing that toucheth the Pupill of the Eye (all over) excludeth the *Light*. For I have heard of a Person very credible; (who himselfe was cured of a Cataract in one of his Eyes,) that whilst the Silver Needle did worke upon the Sight of his Eye, to remove the Filme of the Cataract, he never saw any thing more cleare or perfect, than that white Needle: Which (no doubt) was, because the Needle was lesse than the Pupill of the Eye, and so tooke not the Light from it. The other Error may be, for that the Object of *Sight* doth strike upon the pupill of the Eye, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the Sound a little from the Organ: And so nevertheless there is some Distance required in both.

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Visibles are swifter carried to the Sense, than *Audibles*; As appeareth in Thunder

Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which have beene set downe heretofore, but are proper for this Title.

I conceive also, that the Species of *Audibles*, doe hang longer in the Aire than those of *Visibles*: For although eventhose of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* filipped; A *Fire-brand* carried along, which leaveth a Train of Light behinde it; and in the *Twilight*; And the like: Yet I conceive that *Sounds* stay longer, because they are carried up and downe with the *Winde*: And because of the Distance of the Time, in *Ordnance discharged*, and heard twenty Miles off.

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In *Visibles*, there are not found Objects so odious and ingrate to the Sense, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Objects. And therefore in *Pictures*, those foule *Sights* doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge. And any of the harsh *Discords* in *Musicke*, the Eare doth straight-wayes refuse.

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In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring light*, The Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after a deepe Silence, may be better enquired. It is an old Tradition, that those that dwell neare the *Cataracts* of *Nilus*, are stricken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell upon Bridges.

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It seemeth that the Impression of Colour is so weak, as it worketh not but by a Cone of Direct Beames, or Right Lines, whereof the Basis is in the Object, and the Verticall Point in the Eye; So as there is a Coradiation and Conjunction of Beames; And those Beames so sent forth, yet are not of any force to beget the like borrowed or second Beames, except it be by Reflexion, whereof we speak not. For the Beames passe, and give little Tincture to that Aire, which is Adjacent; which if they did, we should see Colours out of a Right line. But as this is in Colours, so otherwise it is in the Body of Light. For when there is a Skreene between the Candle and the Eye, yet the Light passeth to the Paper whereon Onewriteth; So that the Light is seene, where the Body of the Flame is not seene; And where any Colour (if it were placed where the Body of the Flame is) would not be seene. I judge that Sound is of this Latter Nature; For when two are placed on both sides of a Wall, and the Voice is heard, I judge it is not onely the Originall Sound, which passeth in an Arched Line; But the Sound, which passeth above the Wall in a Right Line, begetteth the like Motion round about it, as the first did, though more weak.

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ALL *Concords* and *Discords* of *Musicke*, are (no doubt) *Sympathies* and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which we call *Broken Musicke*, or *Consort Musicke*: Some *Consorts* of Instruments are sweeter than others; (A Thing not sufficiently yet observed:) As the *Irish Harpe*, and *Base Violl* agree well: The *Recorder* and *Stringed Musicke* agree well: *Organs* and the *Voice* agree well, &c. But the *Virginalls* and the *Lute*; Or the *Welch-Harpe*, and *Irish-Harpe*; Or the *Voice* and *Pipes* alone, agree not so well; But for the Melioration of *Musick*, there is yet much left (in this Point of *Exquisite Consorts*) to trie and enquire.

G

There

Experiments
in Consort
touching the
Sympathy or
Antipathy of
Sounds, one
with another.

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There is a Common Observation, that if a *Lute*, or *Viall*, be layed upon the Backe, with a small *Straw* upon one of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute*, or *Viall*, the *Vnison* to that *Siring* be stricken; it will make the *Siring* move; Which will appeare both to the Eye, and by the *Strawes* Falling off. The like will be, if the *Diapason* or *Eight* to that *Siring* be stricken, either in the same *Lute*, or *Viall*, or in others lying by; But in none of these there is any Report of *Sound*, that can be discerned, but onely Motion.

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It was devised, that a *Viall* should have a Lay of Wire Strings below, as close to the Belly as a *Lute*; And then the *Strings* of Guts mounted upon a Bridge, as in Ordinary *Vialls*; To the end, that by this means, the upper *Strings* stricken, should make the lower resound by *Sympathy*, and so make the *Musick* the better; Which, if it be to purpose, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this device I conceive to be of no use, because the upper *Strings*, which are stopped in great variety, cannot maintaine a *Diapason* or *Vnison*, with the Lower, which are never stopped. But if it should be of use at all; it must be in *Instruments* which haue no Stops; as *Virginals*, and *Harpes*; wherein triall may be made of two Rows of Strings, distant the one from the other.

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The Experiment of *Sympathy* may be transferred (perhaps) from *Instruments* of Strings, to other *Instruments* of *Sound*. As to try if there were in one Steeple, two Bells of *Vnison*, whether the striking of the one would move the other, more then if it were another Accord: And so in Pipes, (if they be of equall Bore, and *Sound*;) whether a little Straw or Feather would move in the one Pipe, when the other is blowne at an *Vnison*.

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It seemeth both in *Eare*, and *Eye*, the *Instrument* of Sense hath a *Sympathy* or Similitude with that which giveth the *Reflexion*; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a *Crystall*, or *Glasse*, or *Water*; So is the *Eare* a sinuous Cave, with a hard Bone, to stop and reverberate the *Sound*: Which is like to the Places that report *Echo's*.

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in Confort
touching the
Hearing or
Hoping of the
Hearing.

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When a Man *Yawneth*, he cannot *Heare* so well. The Cause is, for that the *Membrane* of the *Eare* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Heare* better when we hold our *Breath*, than contrary: In so much as in all Listening to attaine a *Sound* a farr off, Men hold their *Breath*. The Cause is, For that in all *Expiration*, the Motion is Outwards; And therefore, rather driveth away the voice, than draweth it: And besides we see, that in all *Labour* to doe things with any strength, we hold the *Breath*: And listening after any *Sound*, that is heard with difficultie, is a kind of *Labour*.

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Let it betried, for the *Helpe* of the *Hearing*, (and I conceive it likely to succede,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the Bignesse of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the *Skirts*; And the length half a foot, or more. And let the narrow End of it be set close to the *Eare*: And marke whether any *Sound*, abroad in the open *Aire*, will not be heard distinctly, from further distance, than without that *Instrument*; being (as it were) an *Eare-Speckle*. And I have heard there is in *Spain*, an *Instrument* in use to be set to the *Eare*, that helpeth somewhat those that are Thicke of *Hearing*.

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If the *Mouth* be shut Close, nevertheless there is yeelded by the Roof of the *Mouth*, a Murrur. Such as is used by dumbe Men: But if the *Nostrills* be likewise stopped, no such Murrur can be made; Except it be in the Bot-

tome

some of the *Pallate* towards the *Throat*. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as aforesaid, if the *Mouth* be stopped, passeth from the *Pallate* through the *Nostrils*.

The *Repercussion* of *Sounds*, (which we call *Echo*;) is a great Argument of the *Spirituall* Essence of *Sounds*. For if it were *Corporeall*, the *Repercussion* should be created in the same manner, and by like *Instruments*, with the *Originall* *Sound*: But we see what a Number of *Exquisite Instruments* must concur in Speaking of Words, whereof there is no such Matter in the *Returning* of them; But onely a plain Stop, and *Repercussion*.

The *Exquisite Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Scales make excellent *Impressions*: And so it may be thought of *Sounds* in their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot be *Impressions*.

All *Sounds* are suddenly made, and doe suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration: For the *Quaverings*, and *Warblings* in *Lutes*, and *Pipes*, are as swift; And the *Tongue*, (which is no very fine Instrument,) doth in *Speech*, make no fewer *Motions*, than there be Letters in all the Words, which are uttered. But that *Sounds* should not onely be so speedily generated, but carried so farr every way, in such a momentary time, deserveth more Admiration. As for Example; If a Man stand in the Middle of a Field, and speak aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in every little Portion of the *Aire*; And this shall be done in the Space of lesse than a Minute.

The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound*, and then restoreth it selfe; As *Water* doth; Which being divided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbebe the *Sound* as gratefull, but cannot maintain it; for that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiving the *Sound* at the first; But then other *Grosse* and more *Materiate Qualities* of the *Aire* straight-ways suffocate it; Like unto *Flame*, which is generated with *Alacrity*, but straight quenched by the Enmity of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are divided; 1. *Musicall*, *Immusicall*; 2. *Treble*, *Base*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Cleane*, *Harsh* or *Purling*; 7. *Articulate*, *Inarticulate*.

We have laboured (as may appear) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning;) And because it is a *Vertue* which may be called *Incorporeal*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first Centuries;) to make a Pattern or President of an

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in Confort
touching the
Spirituall and
Fine Nature
of Sounds.

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Exact Inquisition; And we shall doe the like hereafter in some other Subjects which require it. For we desire that Men should learne and perceive, how severe a Thing the true *Inquisition of Nature* is; And should accustome themselves, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the World; and not reduce the World to the Narrowness of their Mindes.

Experiment
Solitary touch-
ing the Ori-
ent Colours, in
Dissolution of
Metalls.

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Metalls give *Orients* and *Fine Colours* in *Dissolutions*; As *Gold* giveth an excellent *Yellow*; *Quick-Silver* an excellent *Greene*; *Time* giveth an excellent *Azure*: Likewise in their *Purifications*, or *Rusts*; As *Vermilion*, *Verdegrease*, *Bis*, *Cirrus*, &c. And likewise in their *Vitrifications*. The Cause is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And againe to retain Part of their principall Spirit; Which two Things, (Equall Posture, and Quick Spirits) are required chiefly, to make Colours lightesome.

Experiment
Solitary touch-
ing Prolon-
gation of Life.

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It conduceth unto *Long Life*, and to the more Placide Motion of the Spirits, which thereby do lesse prey and consume the Juyce of the Body; Either that *Mens Actions* be free and voluntary; that nothing be done *Involuntarily*, but *Secundum genium*: Or on the other side, that the *Actions* of Men be full of *Regulation*, and *Commands* within themselves: For then the Victory and Performing of the Command, giveth a good Disposition to the Spirits; Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life; And of the latter, in *Monkes* and *Philosophers*, and such as do continually enjoyne themselves.

Experiment
Solitary touch-
ing Appetite
of Union in
Bodies.

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It is certaine, that in all Bodies, there is an *appetite of Union*, and Evitation of Solution of Continuity: And of this *Appetite* there be many Degrees; But the most Remarkable, and fit to be distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*, this *Appetite* is weak: We see in *Liquours*, the *Threading* of them in *Stillicides*, (as hath been said:) The *Falling* of them in *Round Drops*, (which is the forme of *Union*;) And the *Staying* of them, for a little time, in *Bubbles* and *Froth*. In the second Degree or Kinde, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a Medium betweene the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly sticke and continue to themselves; And therefore they roape, and draw themselves in Threds; As we see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleaving*, more or lesse: and that they love better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantitie, cleaveth to any Thing that is *Solide*; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foil*, or any *Metall Foil*, cleaveth: But those *Bodies* which are noted to be *Clammy*, and *Cleaving*, are such as have a more indifferent *Appetite* (at once,) to follow another Body; And to hold to themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a *Forrain Body*, than in preserving their own *Consistence*; And which have little predominance in *Drought* or *Moisture*.

Time

Time, and Heat, are Fellows in many Effects. Heat drieth Bodies, that do easily expire; As Parchment, Leaves, Roots, Clay, &c. And, so doth Time or Age arefie; As in the same Bodies, &c. Heat dissolveth and melteth Bodies, that keep in their Spirits; As in divers *Liquefactions*; And so doth Time, in some Bodies of a softer Consistence: As is manifest in Honey, which by Age waxeth more liquid; And the like in Sugar; And so in old Oyle, which is ever more cleare, and more hot in Medicinable use. Heat causeth the Spirits to search some Issue out of the Body; As in the *Volatility* of *Metals*; And so doth Time; As in the *Rust* of *Metalls*. But generally Heat doth that in small time, which Age doth in long.

Some Things which passe the Fire are softest at first, and by Time grow Shard; As the Crumme of Bread. Some are harder when they come from the Fire, and afterwards give againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The Cause is, for that in those things which waxe Hard with Time, the Work of the Fire is a Kinde of *Melting*: And in those that waxe Soft with Time, (contrariwise,) the work of the Fire is a Kinde of *Baking*; And whatsoever the Fire baketh, Time doth in some degree dissolve.

Motions passe from one Man to another, not so much by Exciting *Imagination*, as by *Invitation*; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heavy, by any Vapour, or the like. For then they strive (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleep; Or before the Fit of an Ague; doe use to Yawne and Stretch; And doe likewise yeeld a *Voyce* or *Sound*, which is an *Interjection* of *Expulsion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

There be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as taint the *Breath*; Which we see passeth manifestly from Man to Man; And not invisable, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adjacent*; Especially if they consist in an Unctuous Substance, not apt to dissipate; Such are *Scabs*, & *Leprosie*. Fourthly, such as are merely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they never infect, but by Touch onely; And such a Touch, also as commeth within the *Epidermis*; As the venome of the *French Poxe*; And the *Biting* of a *Mad Dog*.

Most Powders grow more Close and Coherent by Mixture of *Water* than by Mixture of *Oyle*, though *Oyle* be the thicker Body; As *Meale*, &c. The Reason is the Congruitie of Bodies; which if it be more, maketh a Perfecter Imbibition, and Incorporation, Which in most Powders is more between *Them* and *Water*, then between *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

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Much

Experiment
Solitary touch-
ing the like
Operations of
Heat, and Time
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Experiment
Solitary touch-
ing the differ-
ing Operations
of Fire,
and Time.
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Experiment
Solitary touch-
ing Actions
by Imitation.
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Experiment
Solitary touch-
ing Infectious
Diseases.
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Experiment
Solitary touch-
ing the In-
corporation of
Powders, and
Liquours.
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Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for others. If the *Body* be *Hot*, and *Void* of *Superfluous* *Moistures*, too much *Motion* hurteth: And it is an *Errour* in *Physitians*, to call too much upon *Exercise*. Likewise men ought to beware, that they use not *Excessive*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentiful Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise*, are First, that it sendeth *Nourishment* into the *Parts* more forcibly. Secondly, that it helpeth to *Excerne* by *Sweat*, and so maketh the *Parts* assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be *Consumed* and *Depredated* by the *Spirits*. The *Evills* that come of *Exercise* are: First, that it maketh the *Spirits* more *Hot* and *Predatory*. Secondly, that it doth absorb like *wife*, and attenuate too much the *Moisture* of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in *Rest*. But generally *Exercise*, if it bee much, is no *Friend* to *Prolongation* of *Life*; Which is one *Cause*, why *Women* live longer than *Men*, because they sit more lesse.

Some *Food* wee may use *long*, and *much*, without *Glutting*; As *Bread*, *Flesh* that is not *fat*, or *rancid*, &c. Some other, (though pleasant,) *Glutious* sooner; As *Sweet Meats*, *Fat Meats*, &c. The *Cause* is, for that *Appetite* consisteth in the *Emptiness* of the *Mouth* of the *Stomack*; Or possessing it with something that is *Astringent*; And therefore *Cold* and *Drie*. But things that are *Sweet* and *Fat*, are more *Filling*: And do swimme and hang more about the *Mouth* of the *Stomack*; And go not down so speedily: And again turn sooner to *Choler*, which is *hot*, and ever abateth the *Appetite*. We see also, that another *Cause* of *Satiety*, is an *Over-Custom*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To give the *Reason* of the *Distaste* of *Satiety*, and of the *Pleasure* in *Novelty*, and to distinguish not only in *Meats* and *Drinks*, but also in *Motions*, *Loves*, *Company*, *delights*, *Studies*, what they be that *Custom* maketh more gratefull; And what more tedious; were a large *Field*. But for *Meats*, the *Cause* is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a *Relish* by former use. And (generally) it is a *Rule*, that whatsoever is somewhat *Ingrate* at first, is made *Gratefull* by *Custom*; But whatsoever is too *Pleasing* at first groweth quickly to *Suavitas*.

NATU-



NATVRALL HISTORIE.

IV. Century.

ACCCELERATION of *Time*, in *Works* of *Nature*, may well be esteemed *Inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the *Enquiry* of it: And for *Acceleration* of *Germination*, we will referre it over unto the place, where we shall handle the *Subject* of *Plants*, generally; And will now begin with other *Accelerations*.

Liquours are (many of them,) at the first, thicke and troubled; As *Must*, *Wort*, *Juyces* of *Fruits*, or *Herbs* expressed, &c. And by *Time* they settle, and Clarifie. But to make them cleare, before the *Time*, is a great *Work*; For it is a *Spurre* to *Nature*, and putteth her out of her pace: And besides, it is of good use, for making *Drinkes*, and *Sauces*, *Potable*, and *Serviceable*, speedily; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts*: For that ever representeth *Bodies* Cleare and *Untroubled*. The third, by the *Refining* the *Spirit* in *Selfe*, which thereby giveth to the *Liquour* more *Splendour*, and more *Lustre*.

First, for *Separation*: It is wrought by *Weight*; As in the ordinary *Residues* or *Settlement* of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a *Calling* of the severall *Parts*, either up, or downe, which is a kinde of *Attraction*;) By *Adhesion*; As when a *Body* more *Viscous* is mingled and agitated with the *Liquour*, which *Viscous Body* (afterwards severed) draweth with it the *grosser Parts* of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

Experiments
in Confort,
touching the
Clarification of
Liquours, and
the Accelerating
thereof.

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Secondly, for the *Even Distribution* of the *Spirus*; It is wrought By *Genle Heat*; And By *Agitation or Motion*; (For of *Time* we speak not, because it is that we would temperate and represent:) And it is wrought also, By *Mixture of some Body*, which hath a vertue to open the *Liquour*, and to make the *Spirus* the better passe thorow.

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Thirdly, for the *Refining* of the *Spirus*, it is wrought likewise By *Heat*, By *Motion*; And By *Mixture of some Body* which hath *Vertue to attenuate*. So therefore (having shewen the *Causes*) for the *Accelerating* of *Clarification*, in general; and the *Enducing* of it; take these *Instances*, and *Trials*.

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It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the sooner: For the *Lees*, though they keep the *Drink* in Heart, and make it lasting; yet withall they cast up some *Spissitude*: And this *Instance* is to be referred to *Separation*.

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On the other side, it were good to trie, what the *Adding* to the *Liquour* more *Lees* than his owne will worke, For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirus*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessel from the *Lees*, and powre the *Lees* of the Racked Vessell into the unracked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirus*.

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Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the *Grosser Parts*, whereby they may fall down into *Lees*. And this *Instance* again is referred to *Separation*.

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The longer *Mals*, or *Herbs*, or the like, are Infused in *Liquour*, the more thick and troubled the *Liquour* is: But the longer they be decocted in the *Liquour*, the clearer it is. The reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the *Grosse Body*, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or setteth at the Bottoms. And therefore the most Exact Way to *Clarifie* is, First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Mals* first infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

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Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost to the very Neck: Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* every day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beer* set by. Take also *Lime* both *Quenched*, and *Vnquenched*, and set the Bottles in them, as *supra*. This *Instance* is referred, both to the *Even Distribution*, and also to the *Refining* of the *Spirus* by *Heat*.

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Take *Bottles*, and *Swing* them; Or *Carry* them in a *Whee-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leave some *Aire*; For if the *Liquour* come close to the *Stopples*, it cannot play, nor flower: And when you have shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the usuall manner: For if it stay with much *Aire* in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24 houres: Then take it, and put it again into a *Bottle* with *Aire*, as *supra*: And thence into a *Bottle* stopped as *supra*: And so repeat the same Operation for seven dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a *Bottle* with a little *Aire* below the Neck, without Emptying. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirus* by *Motion*.

As

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*;) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New Beere*, and stirred with it: For it may be that the *Grosser Part* of the *Beere* will cleave to the *Milke*: The Doubt is, whether the *Milke* will sever well againe; Which is soone tried. And it is usuall in *Clarifying* *Ippocrasse* to put in *Milke*; Which after severeth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they use to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

The *Accelerating* of *Maturation* we will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Ulcers*. This last we referre to another Place, where we shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metals*, &c. whereof we will speake as Occasion serveth. But we will begin with that of *Drinkes*, because it hath such Affinitie with the *Clarification* of *Liquours*.

For the *Maturation* of *Drinks*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the *Grosser Parts*: And it is effected partly, by the same meanes, that *Clarification* is, (whereof we spake before;) But then note, that an Extreme *Clarification* doth spread the *Spirits* so Smooth, as they become Dull, and the *Drink* dead, which ought to have a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

Wee see the *Degrees* of *Maturation* of *Drinkes*; In *Must*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated; *Wine* hath them well united; so as they make the Parts somewhat more Oylie: *Vinegar* hath them Congregated, but more Jejune, and in smaller Quantity; The greatest and finest Spirit and Part being exhaled: For we see *Vinegar* is made by setting the Vessell of *Wine* against the hot Sunne: And therefore *Vinegar* will not burne; For that much of the Finer Parts is exhaled.

The *Refreshing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirus*: So we see that *Open Weather* relaxeth the *Spirus*, and maketh it more lively in *Motion*. We see also *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (so that it spirteth when the *Stopples* is taken forth) maketh the *Drinke* more quick and windie. A *Pan* of *Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. *New Drinke* put to *Drinke* that is *Dead*, provoketh it to worke againe: Nay, which is more, (as some affirme,) A *Brewing* of *New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce* the *Spirits* by some *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Cream* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*; which, as it seemeth, getteth downe the *Whey*.

It is tried, that the *Burying* of *Bottles* of *Drinke* well stopped, either in *drie Earth*, a good depth; Or in the *Bottom* of a *Well* with *Water*; And best of all the *Hanging* of them in a *deepe Well* somewhat above the *Water*, for some fortnights space, is an Excellent *Meanes* of making *Drinke* fresh, and quick

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Experiments in Confort touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickening* of *Drinks*. And next touching the *Maturation* of *Fruits*.

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quick: for the Cold doth not cause any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the rest that remaine: But Cold maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the Parts of the *Liquor* perfectly.

316 As for the *Maturation* of *Fruits*; It is wrought by the *Calling forth* of the *Spirits* of the *Body* outward, and so *Spreading* them more smoothly: And likewise by *Digesting*, in some degree, the *Grasser Parts*: And this is Effected, by *Heat*, *Motion*, *Attraction*; And by a *Rudiment* of *Putrefaction*: For the *Inception* of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Covered over with *Onions*; Covered over with *Crabs*; Clofed up in *Wax*; Shut in a *Box*: &c. There was also an *Apple* hanged up in *Smoake*: Of all which the *Experiment* sorted in this Manner.

318 After a Moneths Space, the *Apple* Encloded in *Wax*, was as Greene and Fresh as at the first Putting in, and the *Kernells* continued White. The Cause is, for that all *Exclusion* of *Open Aire*, (which is ever *Predatory*) maintaineth the *Body* in his first Freshnesse, and Moisture: But the Inconvenience is, that it tasteth a little of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

319 The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Drie, Soft, Sweet, Yellow within. The Cause is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For we see that in a greater *Heat*, a Roast *Apple* Softneth and Melteth, And *Pigs feet*, made of *Quarters* of *Wardens*, scotch and have a skinne of *Cole*) doth Mellow, and not Adure: The *Smoake* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying* of *Pears*, and *Prunes*, in the Oven, and *Removing* of them often as they begin to Sweat, there is a like Operation, But that is with a farre more Intense degree of *Heat*.

320 The *Apples* covered in the *Lime* and *Asbes*, were well *Matured*: As appeared both in their *Yellownesse*, and *Sweetnesse*. The Cause is, for that that Degree of *Heat* which is in *Lime*, and *Asbes*, (being a Smothering *Heat*) is of all the rest most Proper; for it doth neither *Liquefie*, nor *Arefie*; And that is true *Maturation*. Note that the Taste of those *Apples* was good; And therefore it is the *Experiment* fittest for Use.

321 The *Apples*, Covered with *Crabs*, and *Onions*, were likewise well *Matured*. The Cause is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*, which taketh away Hardnesse. So we see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first upon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citius maturascit*.

322 The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the Other; But the *Apple* in the *Straw* more. The Cause is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet Close and Smothering, and which drieth not.

323 The *Apple* in the Close *Box*, was ripened also: The Cause is, for that all Aire kept close, hath a degree of Warmth: As we see in *Wool*, *Fur*, *Plush*, &c. Note that all these were Compared with another *Apple*, of the same kind, that lay of it selfe: And in Comparison of that, were more Sweet, and more Yellow, and so appeared to be more Ripe.

324 Take an *Apple*, or *Pear*, or other like *Fruit*, and Rowle it upon a Table hard: Wee see in Common Experience, that the Rowling doth Soften and Sweeten

Sweeten the *Fruit* presently; Which is Nothing but the *Sweet* Distribution of the *Spirits* into the Parts: For the Unequall Distribution of the *Spirits* maketh the Harshnesse: But this Hard Rowling is betweene Concoction, and a Simple *Maturation*; Therefore, if you should Rowle them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would mature more finely, and like unto the *Naturall Maturation*.

Take an *Apple*, and cut out a Peece of the Top, and cover it, to see whether that *Solution* of *Continuitie* will not hasten a *Maturation*: We see that where a *Wasp*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will Sweeten hastily.

Take an *Apple*, &c. and prick it with a *Pin* full of *Holes*, not deep and smear it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, every day for ten dayes, to see if the *Viruall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these *Trialls* also, as was used in the first, set another of the same *Fruits* by, to Compare them: And trie them, by their *Yellownesse*, and by their *Sweetnesse*.

The World hath been much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of Errour and Imposture; And in the Theory, full of unsound Imaginations. For to say, that *Nature* hath an Intention to make all *Metals* *Gold*; And that, if she were delivered from Impediments, shee would performe her owne *Worke*; And that, if the Crudities, Impurities, and Leprosities of *Metals* were cured, they would become *Gold*; And that a little Quantity of the *Medicine*, in the *Worke* of *Projection*, will turne a Sea of the *Basest Metall* into *Gold*, by *Multiplying*: All these are but dreames: And so are many other Grounds of *Alchymy*. And to help the Matter, the *Alchymists* call in likewise many Vanities, out of *Astrology*; *Naturall Magicke*; Superstitious Interpretations of *Scriptures*; *Auricular Traditions*; Faigned Testimonies of *Ancient Authors*; And the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the World some amends. But we, when we shall come to handle the *Versión & Transmutation* of *Bodies*; And the *Experiments* concerning *Metals*, and *Minerals*; will lay open the true Wayes and Passages of *Nature*, which may lead to this great Effect. And we commend the wit of the *Chineses*, who despair of *Making of Gold*, but are Mad upon the *Making of Silver*: For certain it is, that it is more difficult to make *Gold*, (which is the most Ponderous and Materiate amongst *Metalls*) of other *Metalls*, lesse Ponderous, and lesse Materiate; than (*viâ versâ*) to make *Silver* of *Lead*, or *Quick-Silver*; Both which are more Ponderous than *Silver*; So that they need rather a further

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Solitary, touching the
Making of Gold.

ther Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturati-on*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby turning some of them into *Gold*: For wee conceive indeed, that a perfect good *Concoction*, or *Digestion*, or *Maturati-on* of some *Metalls*, will produce *Gold*. And here wee call to minde, that we knew a *Dutch-man*, that had wrought himfelfe into the beleefe of a great Person, by undertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Over-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great *Lamp*, that should carry a Temperate and Equall *Heat*: And that it was the Work of many Moneths. The Device of the *Lampe* was folly; But the Over-firing now used; And the Equall *Heat* to be required; And the *Making* it a Worke of some good Time; are no ill Discourses.

We resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be used a *Temperate Heat*; For they are ever *Temperate Heats* that *Digest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all upon *Metalls*. The Second is, that the *Spirit* of the *Metall* be quickened, and the *Tangible Parts* opened: For without those two Operations, the *Spirit* of the *Metall*, wrought upon, will not be able to digest the parts. The Third is, that the *Spirits* doe spread themselves Even, and move not *Subsultorily*; For that will make the Parts Close, and Pliant. And this requireth a *Heat*, that doth not rise and fall, but continue as *Equall* as may be. The Fourth is, that no *Part* of the *Spirit* be emitted, but detained: For if there be *Emission* of *Spirit*, the Body of the *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the *Fire*; And partly by the closeness of the *Vessell*. The Fifth is, that there be *Choice* made of the likeliest and best prepared *Metall*, for the *Version*: For that will facilitate the Worke. The Sixth is, that you give *Time* enough for the Worke: Not to prolong Hopes (as the *Alchymists* doe;) but indeed to give *Nature* a convenient Space to worke in. These Principles are most certaine, and true;

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We will now derive a direction of *Triall* out of them; Which may (perhaps) by further *Meditation*, be improved.

Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such, as may keep the *Metall* perpetually *Moulen*, and no more; For that above all importeth to the Work. For the *Materiall*, take *Silver*, which is the *Metall* that in *Nature* Symbolizeth most with *Gold*; Put in also, with the *Silver*, a Tenth Part of *Quick-silver*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space* of *Six* Moneths, at the least. I wish also, that there be, at some times, an Injection of some Oyled Substance; Such as they use in the Recovering of *Gold*, which by Vexing with Separations hath beene made Churlish: And this is, to lay the Parts more Close and Smooth, which is the Maïne Work. For *Gold* (as we see) is the Closest (and therefore the Heaviest) of *Metalls*: And is likewise the most Flexible, and Tentible. Note, that to thinke to make *Gold* of *Quick-silver*, because it is the heaviest, is a Thing not to be hoped; For *Quick-silver* will not endure the Man-nage of the *Fire*. Next to *Silver*, I thinke *Copper* were fittest to bee the *Materiall*.

Gold hath these *Natures*: *Greatnesse* of *Weight*; *Closenesse* of *Parts*; *Fixati-on*; *Plummesse*, or *Sofinesse*; *Immunitie* from *Rust*; *Colour* or *Tincture* of *Yellow*. Therefore the Sure VVay, (though most about,) to make *Gold*, is to know the *Causes* of the Severall *Natures* before rehearsed, and the *Axiomes* concerning the same. For if a man can make a *Metall*, that hath all these *Properties*, Let men dispute, whether it be *Gold*, or no?

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Univerfall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bun-daries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which ever are Unquiet to Get forth, and Congregate with the *Aire*, and to enjoy the *Sunbeames*. The *Getting forth*, or Spreading of the *Spirits*, (which is a De-gree of *Getting forth*,) hath five Differing *Operations*. If the *Spi-rits* be detained within the Bodie, and move more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Milde-ly, there followeth *Digestion*, or *Maturation*; As in *Drinckes*, and *Fruits*. If the *Spirits* be not meerly Detained, but Protrude a little, and that Motion be Confused, and inordinate, there fol-loweth *Putrefaction*; Which ever dissolveth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metalls*. But if that Motion be in a certain Order, there followeth *Vivification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures* Perfect. But if the *Spirits* issue out of

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the Body, there followeth *Deficcation, Induration, Consumption, &c.* As in *Bricke, evaporation of Bodies Liquid, &c.*

329 The *Meanes to Enduce and Accelerate Putrefaction*, are; First by *Adding some Crude or Watry Moisture*; As in *Wetting* of any *Fleth, Fruit, Wood, with Water, &c.* For contrariwise *Vnduous and Oily Substances* preserve.

330 The Second is by *Invitation or Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is *Sound*: Or when *Dung* (which is a *Substance already Purified*) is added to other *Bodies*. And this is also notably seene in *Church-yards*, where they bury much; Where the *Earth* will consume the *Corps*, in farre shorter time, than other *Earth* will.

331 The Third is, by *Clofenesse, and Stopping*, which detaineth the *Spirits*, in *Prison*, more than they would; And thereby irritate them to seeke *Issue*; As in *Corne, and Cloaths*, which waxe *Musty*; and therefore *Open Aire*, (which they call *Aer perspirabilis*) doth preserve: And this doth appeare more evidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning the Humours*, which thereupon *Purifie*.

332 The Fourth is, by *Solution of Continuitie*; As we see an *Apple* will rot sooner, if it be *Cut or Pierced*; And so will *Wood, &c.* And so the *Fleth* of *Creatures* alive, where they have received any *Wound*.

333 The Fifth is, either by the *Exhaling*, or by the *Drawing back* of the *Principall Spirits*, which preserve the *Consistence* of the *Body*; So that when their *Government* is dissolved, every *Part* returneth to his *Nature, or Homogeny*. And this appeareth in *Urine and Bloud*, when they coole, and thereby breake; It appeareth also in the *Gangrene, or Mortification of Fleth*, either by *Opiates*, or by *Intense Colds*. I conceive also the same Effect is in *Pestilences*, for that the *Malignitie* of the *Infecting Vapour*, daunceth the *Principall Spirits*, and maketh them *flie*, and leave their *Regiments*; And then the *Humours, Fleth, and Secondary Spirits*, doe dissolve, and breake as in an *Anarchy*.

334 The Sixth is, when a *Forraigne Spirit*, *Stronger and more Eager* than the *Spirit of the Body*, enureth the *Body*; As in the *Stinging of Serpents*. And this is the *Cause* (generally) that upon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* it self, Congregate too much; As upon *Blowes, and Bruises*; Or when they are *Pent in too much*, as in *Swelling upon Cold*. And we see also, that the *Spirits* coming of *Putrefaction of Humours in Agues, &c.* Which may be counted as *Forraigne Spirits*, though they be bred within the *Body*, do *Extinguish and Suffocate the Naturall Spirits, and Heat*.

335 The Seventh is, by such a *Weak Degree of Heat*, as setteth the *Spirits* in a *little Motion*, but is not able, either to *digest the Parts*, or to *Issue the Spirits*; As is seene in *Fleth* kept in a *Roome* that is not *Coole*; Whereas in a *Coole and Wet Larder* it will keep longer. And we see, that *Vivification* (whereof *Putrefaction* is the *Bastard Brother*), is effected by such *Soft Heats*; As the *Hatching of Egges*; The *Heat of the Wombe, &c.*

336 The Eighth is, by the *Releasing of the Spirits*; which before were close kept by the *Solidnesse* of their *Coverture*, and thereby their *Appetite of Issuing* checked; As in the *Artificiall Rusts* induced by strong *Waters, in Iron, Lead, &c.* And therefore *Wetting* hasteneth *Rust, or Putrefaction* of any thing, because it softneth the *Crust*, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold, or Wet and Dry*; As we see in the *Mouldring of Earth* in *Frosts, and Sunne*, And in the more hasty *Rotting of Wood*, that is sometimes wet, sometimes dry.

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The Tenth is, by *Time, and the Worke and Procedure of the Spirits themselves*, which cannot keep their *Station*; Especially if they be left to themselves, And there be not *Agitation or Locall Motion*. As we see in *Corn* not stirred; And *Mens Bodies* not exercised.

All *Moulds* are *Inceptions of Putrefaction*; As the *Moulds of Pyes, and Fleth*; the *Moulds of Oranges, and Limons*; which *Moulds* afterwards turn into *Wormes*, or more odious *Putrefactions*: And therefore (commonly) prove to be of ill *Odour*. And if the *Body* be *Liquid*, and not apt to putrifie totally, it will cast up a *Mother* in the *Top*; As the *Mothers of Distilled Waters*.

Mosse is a *Kind of Mould*, of the *Earth, and Trees*. But it may be better sorted as a *Rudiment of Germination*; To which we referre it.

It is an *Enquiry* of Excellent use, to Enquire of the *Meanes of Preventing or Staying of Putrefaction*; For therein consisteth the *Meanes of Conservation of Bodies*; For *Bodies* have two *Kindes of Dissolutions*; The one by *Consumption, and Deficcation*; The other by *Putrefaction*. But as for the *Putrefactions* of the *Bodies of Men, and Living Creatures* (as in *Agues, Worms, Consumptions of the Lungs, Impostumes, and Ulcers* both *Inwards and outwards*), they are a great *Part of Physicke, and Surgery*; And therefore we will reserve the *Enquiry* of them to the proper *Place*, where wee shall handle *Medicinall Experiments* of all *Sorts*. Of the rest wee will now Enter into an *Enquiry*: wherein much light may be taken, from that which hath beene said, of the *Meanes to Enduce or Accelerate Putrefaction*: For the *Removing* that, wich caused *Putrefaction*, doth Prevent and Avoid *Putrefaction*.

The First *Meanes* of *Prohibiting or Checking Putrefaction*, is *Cold*: For so we see that *Meat and Drink* will last longer, *Unpurified, or Unsowed*, in *Winter*, than in *Summer*: And we see that *Flowers, and Fruits*, put in *Conseruatories of Snow*, keep fiesh. And this worketh by the *Detention* of the *Spirits, and Constipation* of the *Tangible Parts*.

The Second is *Astringency*: For *Astringency* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibit *Putrefaction*: And by the same reason of *Astringency*, some small Quantity of *Oile of Vitrioll*, will keep *Fresh Water* long from *Putrefying*. And this *Astringency* is in a *Substance* that hath a *Virtual Cold*; And it worketh (partly) by the same *Meanes* that *Cold* doth.

The Third is, the *Excluding of the Aire*; And againe, the *Exposing to the Aire*: For these *Contraries*, (as it cometh often to passe,) worke the same Effect, according to the *Nature of the Subject Matter*. So we see, that *Beere, or Wine*, in *Bottles* close stopped, last long; That the *Garners under Ground* keepe *Corne* longer than those above *Ground*; And that *Fruit* closed in *Wax* keepeth *fresh*: And likewise *Bodies* put in *Honey, and Flower*, keepe more *fresh*: And *Liquours, Drinkes, and Iuces*, with a little *Oyle* cast on the *Top*, keepe *fresh*. Contrariwise, we see that *Cloth and Apparell*, not *Aired*, doe breed *Moathes, and Mould*; and the *Diversitie* is, that in *Bodies*

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that need *Detention* of *Spirits*, the *Exclusion* of the *Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the *Superfluous Moisture*, it doth hurt, for they require *Airing*.

344 The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For the *Subtill Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* *Integrall*, and their *Parts* together; As wee see that *Turning over* of *Corne* in a *Garner*; Or *Letting* it runne like an *Hour-glasse*, from an upper *Roome* into a *Lower*, doth keepe it *Sweet*: And *Running Waters* putrifie not: And in *Mens Bodies*, Exercise hindreth *Putrefaction*; And contrariwise *Rest*, and *Want* of *Motion*, or *Stoppings*, (whereby the *Runne* of *Humours*, or the *Motion* of *Perspiration*, is stayed,) further *Putrefaction*; As we partly touched a little before.

345 The Fifth is, the *Breathing forth* of the *Adventitious Moisture* in *Bodies*; For as *Wetting* doth hasten *Putrefaction*, So *Convenient Drying*, (whereby the more *Radical Moisture* is onely kept in,) putteth back *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the *Shade*, or dried in the hot *Sunne*, for a small time, keep best. For the *Emission* of the *Loose* and *Adventitious Moisture*, doth betray the *Radical Moisture*; And carryeth it out for *Company*.

346 The Sixth is, the *Strengthening* of the *Spirits* of *Bodies*; For as a *Great Heat* keepeth *Bodies* from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a *Strong Spirit* likewise preserveth, and a *Wkeake* or *Faint Spirit* dispoeth to *Corruption*. So we finde that *Salt water* corrupteth not so soon as *Fresh*: And *Salting* of *Oysters*, and *Powdring* of *Meat*, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserve it from *Putrefying*, or speedy *Souring*. So wee see that *Strong Beere* will last longer than *Small*; And all Things, that are *Hot* and *Aromaticall*, doe helpe to *Preserve Liquours*, or *Powders*, &c. Which they doe, as well by *Strengthening* the *Spirits*, as by *Soaking* out the *loose Moisture*.

347 The Seventh is, *Separation* of the *Cruder Parts*, and thereby making the *Body* more *Equall*; for all unperfect *Mixture* is apt to *Putrefie*; And *Watry Substances* are more apt to *Putrefie*, than *Oily*. So wee see *Distilled Waters* will last longer than *Raw waters*; And Things that have passed the *Fire*, doe last longer than those that have not passed the *Fire*; as *Dried Peares*, &c.

348 The Eighth is, the *Drawing forth continually* of that part, where the *Putrefaction* beginneth: Which is (commonly) the *Loose* and *Watry Moisture*; Not onely for the *Reason* before given, that it provoketh the *Radical Moisture* to come forth with it; But because being detained in the *Body*, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming* of dead *Bodies*: And the same *Reason* is of *Preserving Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

349 The Ninth is, the *Commixture* of any Thing that is more *Oily*, or *Sweet*: For such *Bodies* are left apt to *Putrefie*, the *Aire* working little upon them; And they not putrefying preserve the rest. And therefore we see *Syrups*, and *Ointments*, will last longer, than *Juyces*.

350 The Tenth is, the *Commixture* of somewhat that is *Drie*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is *dry* is unapt to putrefie: And therefore *Smoake* preserveth *Flesh*; As wee see in *Bacon*, and *Neats-Tongues*, and *Martlemas Beefe*, &c.

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The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserve *Bodies*, longer than other *Aires*, seemeth to mee *Probable*; For that the *Blowne Aires*, being *Over-charged* and *Compressed*, will hardly receive the *Exhaling* of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto *Flesh* was put, and likewise a *Flower*, and it forted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather further *Putrefaction*: The way were therefore, to blow strongly, with a *Paire* of *Bellows*, into a *Hog-head*, putting into the *Hog-head* (before) that which you would have preserved; And in the instant that you withdraw the *Bellows*, stop the *Hole* close.

THE Experiment of *Wood* that *Shineth* in the *Darke*, we have diligently driven, and pursued: The rather, for that of all Things, that give *Light* herebelow, it is the most *Durable*; And hath least *Apparent Motion*. *Fire* and *Flame* are in continuall *Expende*; *Starres* shineth onely while it is in *Scraping*; And *Salt-water* while it is in *Dashing*; *Glow-wormes* have their *Shining* while they live, or a little after; Onely *Scales* of *Fishes* (*Putrified*) seeme to be of the same *Nature* with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an *Inward Motion*, as well as *Fire*, or *Light*. The *Triall* forted thus. 1. The *Shining* is in some *Peeces* more *Bright*, in some more *Dimme*; but the most *Bright* of all doth not attaine to the *Light* of a *Glow-worme*. 2. The *Woods* that have beene tried to shine, are chiefly *Sallm*, and *Willow*; Also the *Ash*, and *Hassle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe shine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by *Daylight*, is in some *Peeces* *White*, in some *Peeces* inclining to *Red*; Which in the *Countrey* they call the *White*, and *Red Garret*. 5. The *Part* that *Shineth*, is, (for the most *Part*) somewhat *Soft*, and *Moist* to feele to; But some was found to be *Firme* and *Hard*; So as it might be figured into a *Crosse*, or into *Beads*, &c. But you must not look to have an *Image*, or the like, in any Thing that is *Lightsome*; For even a face in *Iron* red *Hot* will not be seen, the *Light* confounding the small differences of *Lightsome* and *Darksome*, which shew the figure. 6. There was the *Shining Part* pared off, till you came to that, that did not *Shine*; But within two *Dayes* the *Part* *Contiguous* began also to *Shine*, being laid abroad in the *Dew*; So as it seemeth the *Putrefaction* spreadeth. 7. There was other dead *Wood* of like kinde, that was *Laid abroad*, which *Shined* not at the first; But after a *Nights* lying abroad began to *Shine*. 8. There was other *Wood*, that did *First Shine*; And being laid drie in the *House*, within five or sixe *dayes*, lost the *Shining*; And laid abroad again, *Recovered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a *Seven night*, lost their *Shining*; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring* of *Holes*, in that kinde of *Wood*, and then laying it abroad, seemeth to conduce to make it *Shine*: The *Cause* is, for that all *Solution* of *Continuity* doth help on *Putrefaction*, as was touched before. 11. No *Wood* hath beene yet tried to *Shine*, that was cut downe alive, but such as was *Rotted*, both in *Stocke*, and *Root*, while it grew. 12. *Part* of the *Wood* that *Shined*, was steeped in *Oyle*, and retained the *Shining* a *Fortnight*. 13. The like succeeded in some steeped in *Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* be laid abroad every *Night*, and taken in and *Sprinkled* with *Water* in the *Day*, is not yet tried. 15. *Triall* was made of laying it abroad in *Frostie weather*, which hurt it not. 16. There was a great *Pece* of a *Root* which did shine, and the *Shining Part* was cut off, till no more

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Shined;

Experiment
Solitary touch-
ing wood
Shining in the
Darke.

Shined; Yet after two Nights, though it were kept in a drie Room, it got a Shining.

Experiment
Solitary touch-
ing the Ac-
celeration of
Birth.

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THe Bringing forth of Living Creatures may be accelerated in two Respects: The one, if the Embryon ripeneth and perfecteth sooner: The other, if there be some Cause from the Mothers Body, of Expulsion or Putting it downe: whereof the Former is good, and argueth Strength; The Latter is ill, and cometh by Accident or Disease. And therefore the Ancient Observation is true, that the Childe borne in the Seventh Moneth, doth commonly well; But Borne in the Eighth Moneth, doth (for the most part) die. But the Cause assigned is Fabulous; Which is, that in the Eighth Moneth, should be the returne of the Raigne, of the Planet Saturne: which (as they say) is a Planet Maligne; whereas in the Seventh is the Raigne of the Moone, which is a Planet Propitious. But the true Cause is, for that where there is so great a Prevention of the Ordinary time, it is the lustinesse of the Childe; But when it is lesse, it is some indisposition of the Mother.

Experiment
Solitary touch-
ing the Ac-
celeration of
growth and
Stature.

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TO Accelerate Growth or Stature, it must proceed; Either from the Plenty of the Nourishment; Or from the Nature of the Nourishment; Or from the Quickening and Exciting of the Naturall Heat. For the first, Excesse of Nourishment is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Height. And you may take an Experiment from Plants, which, if they spread much, are feldome tall. As for the Nature of the Nourishment; First, it may not be too Drie; And therefore Children in Dayrie Countries doe waxe more tall; than where they feed more upon Bread, and Flesh. There is also a received Tale; That boyling of Daisie Roots in Milke (which it is certain are great Driers) will make Dogs little. But so much is true, that an Over-Drie Nourishment in Childhood putteth backe Stature. Secondly, the Nourishment must be of an Opening Nature; For that Attenuateth the Juycce, and furthereth the Motion of the Spirits, upwards. Neither is it without cause, that Xenophon, in the Nouriture of the Persian Children, doth so much commend their Feeding upon Cardamon; which (he saith) made them grow better, and bee of a more Active Habit. Cardamon is in Latine Nasturtium: And with us Water-Cresses; Which, it is certaine, is an Herbe, that whilest it is young, is Friendly to Life. As for the Quickening of Naturall Heat, it must be done chiefly with Exercise; And therefore (no doubt) much Going to Schoole, where they sit so much, hindreth the Growth of Children; whereas Countrey-People, that goe not to Schoole, are commonly of better Stature. And againe Men must beware how they give Children, any thing that is Cold in Operation; For even Long Sucking doth hinder both Wit, and Stature. This hath beene tryed, that a Whelp, that hath beene fed with Nire in Milke, hath become very little, but extreme lively: For the Spirit of Nire is Cold. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to Growth: And all for the same Reason; For Heat is requisite to Growth: But after a Man is come to his Middle Age, Heat consumeth the Spirits; which the Coldnesse of the Spirit of Nire doth helpe to condense, and correct.

There bee two Great Families of Things; You may terme them by severall Names; Sulphureous and Mercureall, which are the Chymists Words: (For as for their Sal, which is their Third Principle,

Experiment
in Confort
touching Sal-
phur and Mer-
cury, two of
Peracelsus
Principles.

Principle, it is a Compound of the other two;) *Inflammable*, and *Not Inflammable*; Mature and Crude; Oily and Watry. For wee see that in Subterrancies there are, as the Fathers of their Tribes, Brimstone and Mercury: In Vegetables, and Living Creatures there is Water and Oile: In the Inferiour Order of Pneumaticalls there is Aire and Flame: And in the Superiour, there is the Body of the Starre, and the Pure Sky. And these Paires, though they be unlike in the Primitive Differences of Matter, yet they seeme to have many Consents: For Mercury and Sulphure are principall Materialls of Metalls; Water and Oyle, are principall Materialls of Vegetables, and Animals; And seeme to differ but in Maturation, or Concoction: Flame (in Vulgar Opinion) is but Aire Incensed; And they both have Quicknesse of Motion, and Facilitie of Cession, much a like: And the Interstellar Sky, (though the Opinion be vaine, that the Starre is the Denser Part of his Orbe,) hath notwithstanding so much Affinity with the Starre, that there is a Rotation of that, as well as of the Starre. Therefore, it is one of the greatest Magnalia Nature, to turne Water or Watry Juycce into Oile or Oily Juycce: Greater in Nature, than to turne Silver, or Quick-silver, into Gold.

The Instances we have, wherein Crude and Watry Substance turneth into Fat and Oily, are of foure kindes. First in the Mixture of Earth and Water; which mingled by the help of the Sunne, gather a Nitrous Fatnesse, more than either of them have severally; As we see, in that they put forth Plants, which need both Juyces.

The Second is in the Assimilation of Nourishment, made in the Bodies of Plants, and Living Creatures; Whereof Plants turne the Juycce of meere Water and Earth, into a great deale of Oily Matter: Living Creatures, though much of their Fat and Flesh, are out of Oily Aliments, (as Meat, and Bread,) yet they Assimilate also in a Measure their Drink of Water, &c. But these two Wayes of Version of Water into Oyle, (namely by Mixture, and by Assimilation) are by many Passages, and Percolations, and by long Continuance of soft Heats, and by Circuits of Time.

The third is in the Inception of Purefaction; As in Water Corrupted; And the Mothers of Waters Distilled; Both which have a kinde of Fatnesse, or Oyle.

The Fourth is in the Dulcoration of some Metalls; As Saccharum Saturni, &c.

The Intension of Version of Water into a more Oily Substance, is by Digestion; For Oile is almost Nothing else but Water Digested; And this Digestion is principally by Heat; Which Heat must be either Outward, or Inward: Again, it may be by Provocation, or Excitation; Which is caused by the Mingling of Bodies already Oily, or Digested; For they will somewhat Communicate their Nature with the rest. Digestion also is strongly effected by direct Assimilation, of Bodies Crude into Bodies Digested; As in Plants, and Living Creatures, whose Nourishment is farre more Crude than their Bodies:

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dies: But this *Disgestion* is by a great Compasse, as hath beene said. As for the more full Handling of these two Principles, whereof this is but a Taste; (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leave it to the *Title of Version of Bodies*; And likewise to the *Title of the First Congregations of Matter*; Which like a Generall Assembly of Estates, doth give Law to all Bodies.

Experiment
Solitary touch-
ing *Chamele-*
ons.

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A *Chameleon* is a Creature about the Bignesse of an Ordinary Lizard: His Head unproportionably bigge; His eyes great: He mooveth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skinne spotted with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath five Fingers; three on the Outside, and two on the Inside; His Tongue of a marvellous Length in respect of his Body, and hollow at the end, which he will launch out to prey upon *Flies*. Of Colour Green, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If he be laid upon Green, the Greene predominateth; If upon Yellow, the Yellow; Not so if he be laid upon Blew, or Red, or White; Onely the Greene Spots receive a more Orient Lustre; Laid upon Blacke, hee looketh all Blacke, though not without a Mixture of Greene. He feedeth not onely upon Aire, (though that be his principall Sustenance;) For sometimes he taketh *Flies*, as was said; Yet some that have kept *Chameleons* a whole yeare together, could never perceive that ever they fed upon any Thing else but Aire; And might observe their Bellies to swell after they had exhausted the Aire, and closed their Jawes; Which they open commonly against the Rayes of the Sunne. They have a foolish Tradition in *Magick*, that if a *Chameleon* be burnt upon the Top of an House, it will raise a Tempest; Supposing (according to their vain Dreams of *Sympathies*) because he nourisheth with Aire, his Body should have great vertue to make Impression upon the Aire.

Experiment
Solitary touch-
ing *Subterranean*
Fires.

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It is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleare, and cast not forth such Smoake, and Ashes, and Pumice, as *Mountain* *Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountains*, and *Earthquakes* which cast *Flame*. There be also some *Blinde Fires*, under *Stone*, which flame not out, but *Oile* being powred upon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remove the *Stone*, it is *Heat*, rather than *Flame*; Which nevertheless is sufficient to Enflame the *Oile*.

Experiment
Solitary touch-
ing *Nitre*.

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It is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if *Foule* Cloaths be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And we see *Warre Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which severeth and divideth any thing that is foule, and Viscous, and sticketh upon a Body.

Experiment
Solitary touch-
ing *Congea-*
ling of Aire.

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Take a *Bladder*, the greatest you can get; Fill it full of Winde, and tye it about the Neck with a Silke thred waxed; And upon that likewise Wax very close, So that when the Neck of the *Bladder* drieth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Fault*, or in a *Conservatory of Snow*, the *Snow* being made hollow about the *Bladder*;

Bladder; And after some Fortnights distance, see whether the *Bladder* bee shrunk: For if it bee, then it is plaine, that the *Coldnesse* of the *Earth* or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Consequence.

IT is a Report of some good credit, that in *Deepe Caves*, there are *Penzile Chrystall*, and *Degrees of Chrystall* that drop from above; And in some other, (though more rarely) that rise from below. Which though it bee chiefly the Worke of Cold, yet it may be, that *Water*, that passeth thorow the *Earth*, gathereth a Nature more clammy, and fitter to Congeale, and becomes Solide, than *Water* of it selfe. Therefore Triall would be made, to lay a Heape of *Earth*, in great Frosts, upon a Hollow Vessell, putting a Canvase betweene, that it fallerth not in: And poure *Water* upon it, in such Quantity as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessell, and lesse apt to dissolve, than ordinarily. I suppose also, that if you make the *Earth* narrower at the bottome, than at the Top, in fashion of a *Sugar Loafe* Reversed, it will help the Experiment. For it will make the Ice, where it issueth, lesse in Bulk; And evermore Smalnesse of Quantity is a Helpe to *Version*.

Take *Damaske Roses*, and pull them; Then drie them upon the Top of an House, upon a Lead or Tarras, in the Hot Sunne, in a cleare day, between the Houres (onely) of twelve and two; or thereabouts. Then put them into a Sweet Drie Earthen Bottle, or a Glasse with narrow Mouthes, stuffing them close together, but without Bruising: Stop the Bottle, or Glasse, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other body, either by *Purefaction*, or *Arefaction*, as the *Adventitious Moisture*, which hangeth loose in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radical* Moisture along with it, when it self goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserve the Juyce of the Body. Note that these *Roses*, when you take them from the Drying, have little or no Smell; So that the Smell is a Second Smell, that issueth out of the Flower afterwards.

The Continuance of *Flame*, according unto the diversity of the *Body Enflamed*, and other Circumstances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almost) of a Momentary Lasting, yet it receiveth the More, and the Lesse: we will first therefore speake (at large) of *Bodies Enflamed*, wholly, and Immediately, without any *Wieke* to helpe the *Inflammation*. A Spoonfull of *Spirits of Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of *Spirits of Wine*, Mixed with the Sixth Part of a Spoonfull of *Nitre* burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay-salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolved into a Blacke water, 110 Pulses. A Cube, or Pellet of *Yellow Wax*, was taken, as much as halfe the *Spirits of Wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonfull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was cruddled. Mixed with the Sixth Part of a spoonfull of *Water*, it burnt to the space of 86. Pulses; With an Equall Quantity of *Water*, onely to the space of 4. Pulses. A small *Pebble* was laid in the Middest, and the *Spirits of Wine* burnt to the space of 94. Pulses.

Experiment
Solitary touch-
ing *Congea-*
ling of Water
into *Chrystall*.

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Experiment
Solitary touch-
ing *Preser-*
ving of Rose
leaves both in
colour and
Smell.

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Experiments
in Confort
touching the
Continuance of
Flame.

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Pulses. A Peece of Wood, of the Bignesse of an Arrow, and about a Fingers length, was set up in the Middest, and the Spirit of Wine burnt to the space of 94. Pulses, So that the Spirit of Wine Simple, endured the longest; And the Spirit of Wine with the Bay-sali, and the Equall Quantity of Water, were the shortest.

Consider well, whether the more speedy Going forth of the flame, be caused, by the Greater Vigour of the Flame in Burning; Or by the Resistance of the Body mixed, and the Aversion thereof to take Flame: Which will appeare by the Quantity of the Spirit of Wine, that remaineth after the Going out of the Flame. And it seemeth clearly to bee the latter; For that the Mixture of Things, least apt to burne, is the Speediest in going out. And note, by the way, that Spirit of Wine burned, till it goe out of it self, will burne no more; And tasteth nothing so hot in the Mouth as it did; No nor yet sowre, (as if it were a degree towards Vinegar,) which Burnt Wine doth; but flat and dead.

Note, that in the Experiment of Wax aforesaid, the Wax dissolved in the burning, and yet did not incorporate it self, with the Spirit of Wine, to produce one Flame; but wherefoever the Wax floated, the Flame forsooke it, till at last it spread all over, and put the Flame quite out.

The Experiments of the Mixtures of the Spirit of Wine enflamed, are Things of discovery, and not of Use: But now we will speake of the Continuance of Flames, such as are used for Candles, Lamps, or Tapers; consisting of Inflammable Matters, and of a Wicke that provoketh Inflammation. And this importeth not onely Discovery, but also Use and Profit; For it is a great Saving in all such Lights, if they can be made as faire and right as others, and yet last longer. Wax Pure made into a Candle, and Wax Mixed severally into Candle-stuffe, with the Particulars that follow; (viz. Water, Aqua-vita, Milke, Bay-sali, Oyle, Butter, Nitre, Brimstone, Saw-dust,) Every of these bearing a Sixth Part to the Wax; And every of these Candles Mixed, being of the same Weight and Wicke, with the Wax Pure, proved thus in the Burning, and Lasting. The Swiftest in Consuming was that with Saw-dust; Which first burned faire till some part of the Candle was consumed, and the Dust gathered about the Snafte; But then it made the Snafte bigge, and long, and to burne duskishly, and the Candle wasted in halfe the time of the Wax Pure. The next in Swiftnesse, were the Oyle, and Butter, which consumed, by a Fifth part, swifter than the Pure Wax. Then followed in Swiftnesse the Cleare Wax it selfe. Then the Bay-Salt, which lasted about an Eighth part longer than the Cleare Wax. Then followed the Aqua-vita, which lasted about a Fifth part longer than the Cleare Wax. Then followed the Milke, and Water, with little difference from the Aqua-vita, but the Water slowest. And in these foure last, the Wicke would spit forth little Sparks: For the Nitre, it would not hold lighted above some Twelve Pulses: But all the while it would spit out Portions of Flame, which afterwards would go out into a vapour. For the Brimstone, it would hold lighted, much about the same with the Nitre; But then after a little while, it would harden and cake about the Snafte: So that the Mixture of Bay-Salt with Wax, will winne an Eighth part of the time of lasting, and the Water a Fifth.

After the Severall Materials were tried, Triall was likewise made of severall Wickes; As of Ordinary Cotton, Sowing Thred, Russh, Silke, Straw; and Wood. The Silke, Straw, and Wood, would flame a little, till they came to the Wax, and then goe out: of the Other Three, the Thred consumed faster than the Cotton, by a Sixth part of Time: The Cotton next: Then the Russh consumed

sumed slower than the Cotton, by at least a third part of time. For the Bignesse of the Flame, the Cotton, and Thred, cast a Flame much alike; and the Russh much lesse, and dimmer. Quere, whether Wood, and Wickes both, as in Torches, consume faster, than the Wickes Simple?

We have spoken of the Severall Materials, and the Severall Wickes: But to the lasting of the Flame, it importeth also; Not only what the Materiall is, but in the same Materiall, whether it be Hard, Soft, Old, New &c Good Housewives, to make their Candles burne the longer, use to lay them (one by one) in Bran, or Flower, which make them harder, and so they Consume the slower: Inasmuch, as by this meanes, they will out-last other Candles, of the same stuffe, almost Halfe in Halfe. For Bran and Flower have a Vertue to Harden: So that both Age, and lying in the Bran, doth help to the Lasting. And wee see, that Wax Candles last longer than Tallow Candles, because Wax is more firme, and hard.

The Lasting of Flame also dependeth upon the easie Drawing of the Nourishment; As we see in the Court of England, there is a Service which they call All-night; which is (as it were) a great Cake of wax, with the Wicke in the Middest; whereby it commeth to passe, that the Wicke fetcheth the Nourishment further off. We see also that Lamps last longer, because the vessell is farre broader, than the Breadth of a Taper, or Candle.

Take a Turreted Lampe of Tinne, made in the forme of a Squire; The Heighth of the Turret being thrice as much, as the length of the lower part, whereupon the Lampe standeth: Make only one Hole in it, at the End of the Returne further from the Turret. Reverse it, and fill it full of Oile, by that Hole; And then set it upright againe; And put a Wicke in at the Hole; And lighten it: You shall finde, that it will burne flow, and a long time. Which is caused, (as was said last before,) for that the Flame fetcheth the Nourishment a farre off. You shall finde also, that as the Oile wasteth, and descendeth, so the Top of the Turret, by little and little, filleth with Aire; which is caused by the Rarefaction of the oile by the Heat. It were worthy the Observation, to make a Hole, in the Top of the Turret, and to trie, when the Oile is almost consumed, whether the Aire made of the Oile, if you put to it a Flame of a Candle, in the letting of it forth, will Enflame. It were good also to have the Lampe made, not of Tinne, but of Glasse, that you may see how the Vapour, or Aire gathereth, by degrees, in the Top.

A fourth Point, that importeth the lasting of the Flame, is the Closenesse of the Aire, wherein the Flame burneth. Wee see, that if Wind bloweth upon a Candle, it wasteth apace. We see also, it lasteth longer in a Lanthorne, than at large. And there are Traditions of Lamps, and Candles, that have burnt a very long time, in Caves, and Tombs.

A Fifth Point, that importeth the Lasting of the Flame, is the Nature of the Aire, where the Flame burneth; whether it be Hot or Cold; Moist or Drie. The Aire, if it be very Cold, irritateth the Flame, and maketh it burne more fiercely; (As Fire scorseth in Frostie weather;) And so furthereth the Consumption. The Aire once heated, (I conceive) maketh the Flame burne more mildly, and so helpeth the Continuance. The Aire, if it be Drie, is indifferent: The Aire, if it be Moist, doth in a Degree quench the Flame: (As wee see Lights will go out in the Damps of Mines;) And howsoever maketh it burne more dully: And so helpeth the Continuance.

Trialls in Earthe serve for Preservation; And for Condensation; And for Induration of Bodies. And if you intend Condensation, or Induration, you may

Experimentus
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Injurious
of divers
Bodies
in Earthe.

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may bury the Bodies so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may do for *Conservation*, if the Bodies be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preservation* of Bodies, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must vault the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserve them; Except the *Earth* be very Drie, and Sandie.

377 An *Orange*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Fortnight Space, foure Foot deepe within the *Earth*, though it were in a Moist Place, and a Rainie Time, yet came forth, no wayes mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Iuyce somewhat flatted. But with the *Buriall* of a Fortnight more they became Putrified.

378 A Bottle of *Beere*, buried in like manner, as before, became more lively, better tasted, and Clearer, than it was. And a Bottle of *Wine* in like manner. A Bottle of *Vinegar*, so buried, came forth more lively, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and lively, if not better, than before.

379 It were a profitable Experiment, to preserve *Oranges*, *Lemons*, and *Pomegranates*, till Summer; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessell, well covered, that the Moisture of the *Earth* come not at them; Or else by putting them in a *Conservatory of Snow*. And generally, whosoever will make Experiments of Cold, let him be provided of three Things; A *Conservatory of Snow*; A good large Vault, twenty foot at least under the Ground; And a Deepe Well.

380 There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that have lost their Colours, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But upon Triall of Sixe Weekes *Buriall*, there followed no Effect. It were good to trie it, in a Deep Well; Or in a *Conservatory of Snow*, where the Cold may be more Constringent; And so make the Body more united, and thereby more Resplendent.

Experiment
Solitary touch-
ing the Affections
in Mens Bodies
from Severall
Winds.

381

Mens Bodies are heavier, and lesse disposed to Motion, when *Southerne Winds* blow, than when *Northerne*. The Cause is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt, and waxe fluide, and so flow into the Parts; As it is seen in *Wood*, and other Bodies; which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Activity of the Body consisteth chiefly in the *Sinewes*, which, when the *Southerne Wind* bloweth, are more relax.

Experiment
Solitary touch-
ing Winter and
Summer Sick-
nesses.

382

It is commonly seen, that more are Sick in the Summer, and more Dye in the Winter, Except it be in *Pestilent Diseases*, which commonly raigue in Summer, or Autumn. The Reason is, because Diseases are bred (indeed) chiefly by Heat; But then they are Cured most by Sweat, and Purge, which in the Summer commeth on, or is provoked, more Easily: As for *Pestilent Diseases*, the Reason why most Dye of them in Summer, is because they are bred most in the Summer; For otherwise those that are touched are in most danger in the Winter.

The

THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Upon the Superficiall Ground, that *Heat* and *Moisture* cause *Purefaction*. In *England* it is found not true; For, many times, there have beene great *Plagues* in *Drie Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake up in the *Summer-moneths*, when the *Weather* is *Hot* and *Dry*.

Many Diseases, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the Cause is falsly imputed to the *Constitution* of the *Aire*, at that time, when they breake forth, or raigue; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the Diseases, that enue upon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Triall hath beene made, with *Earthen Bottles* well stopped, hanged in a Well of Twenty Fathome deepe, at the least; And some of the Bottles have beene let downe into the *Water*, some others have hanged above, within about a fathome of the *Water*; And the *Liquours* so tried have beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Prooffe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as above,) have not beene palled or deaded at all; But as good, or somewhat better, than Bottles of the same *Drinkes*, and *Stalenessse*, kept in a *Celler*. But those which did hang above *Water*, were apparently the best; And that *Beere* did flower a little; whereas that under *Water* did not, though it were Fresh. The *Milke* sowered, and began to Putrifie. Nevertheless it is true, that there is a *Village* neare *Blois*, where in *Deepe Caves* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some Cause of this Triall of *Hanging Milke* in the Well: But our prooffe was naught; Neither doe I know, whether that *Milke* in those *Caves*, bee first boyled. It were good therefore to trie it with *Milke* Sodden, and with *Creame*; For that *Milke* of it selfe is such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolved. It were good also to trie the *Beere*, when it is in *Wart*, that it may bee seene, whether the *Hanging* in the Well, will Accelerate the *Ripening* and *Clarifying* of it.

Divers, we see, doe *Stut*. The Cause may bee, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to move. And therefore wee see, that *Naturalls* doe generally *Stut*: And wee see that in those that *Stut*, if they drinke *Wine* moderately, they *Stut* lesse, because it heateth: And so we see, that they that *Stut*, doe *Stut* more in the first offer to speake, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Drinessse* of the *Tongue*; which likewise maketh it lesse apt to move, as well as Cold; For it is an Affect that it cometh to some *Wise* and *Great Men*; As it did unto *Moses*, who was *Lingua Prædita*; And many *Stutters* (wee finde) are very *Cholericke Men*; *Choler* Enducing a *Drinessse* in the *Tongue*.

Experiment
Solitary touch-
ing Pestilent
Seasons.

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Experiment
Solitary touch-
ing an Ex-
posed person
about Epidemicall Dis-
eases.

384

Experiment
Solitary touch-
ing the
Alteration or
Preservation
of Liquours in
Wells, or deepe
Vaults.

385

Experiment
Solitary touch-
ing Stuttering.

386

Experiments
in Confort
touching
Smells.

387

S Smells, and other Odours are Sweeter in the Aire, at some Distance, than neare the Nose; As hath beene partly touched heretofore. The Cause is double: First the finer Mixture, or Incorporation of the Smell: For wee see that in *Sounds* likewise, they are Sweetest, when we cannot heare every Part by it selfe. The other Reason is, for that all Sweet Smells have joyned with them, some Earthy or Crude Odours; And at some distance the Sweet, which is the more Spirituall, is perceived; And the Earthy reacheth not so farre.

388

Sweet Smells are most forcible, in Drie Substances, when they are Broken; And so likewise in Oranges, or Limons, the Nipping of their Rinde, giveth out their Smell more: And generally, when Bodies are Moved or Stirred, though not Broken, they Smell more; As a Sweet-Bagge waved: The Cause is double: The one, for that there is a Greater Emission of the Spirit, when Way is made: And this holdeth in the Breaking, Nipping, or Crushing; It holdeth also, (in some degree) in the Moving: But in this last, there is a Concurrence of the Second Cause; Which is the Impulsion of the Aire, that bringeth the Sent faster upon us.

389

The daintiest Smells of Flowers, are out of those Plants, whose Leaves smell not; As Violets, Roses, Wall-flowers, Gilly-flowers, Pincks, Wood-bines, Vine-flowers, Apple-Blooms, Lime-Tree Blooms, Beane-Blooms, &c. The Cause is, for that where there is Heat and strength enough in the Plant, to make the Leaves Odorate, there the Smell of the Flower is rather Evanescent and Weaker, than that of the Leaves; As it is in Rose-Mary-Flowers, Lavender-Flowers, and Sweet-Briar-Roses. But where there is lesse Heat, there the Spirit of the Plant, is digested and refined, and severed from the Grosser Juycce, in the Efflorescence, and not before.

390

Most Odours smell best, Broken or Crushed, as hath beene said; But Flowers Pressed or Beaten, doe lesse the Freshnesse and Sweetnesse of their Odour. The Cause is, for that when they are Crushed, the Grosser and more Earthy Spirit commeth out with the Finer, and troubleth it; Whereas in stronger Odours there are no such Degrees of the Issue of the Smell.

Experiments
in Confort,
touching the
Goodnesse and
Choice of
Water.

391

IT is a Thing of very good Use, to Discover the Goodnesse of Waters. The Taste, to those that Drink Water onely, doth somewhat: But other Experiments are more sure. First, try Waters by Weight; Wherein you may finde some difference, though not much: And the Lighter you may account the Better.

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Secondly, try them by Boiling upon an Equall Fire: And that which consumeth away fastest, you may account the Best.

393

Thirdly, try them in Severall Boiles, or Open Vessels, Matches in every Thing else, and see which of them Last Longest, without Stench, or Corruption. And that which holdeth Unpurified longest, you may likewise account the Best.

394

Fourthly, try them by Making Drinks Stronger, or Smaller, with the same Quantity of Mault; And you may conclude, that that Water, which maketh the Stronger Drink, is the more Concocted, and Nourishing; though perhaps it be not so good for Medicinall use. And such Water (commonly) is the Water of Large and Navigable Rivers: And likewise in Large and Cleane Ponds of Standing Water: For upon both them, the Sunne hath more power than upon Fountains, or Small Rivers. And I conceive that Chalk-water is next them the best, for going furthest in Drink: For that also helpeth Concoction; So it be out of a Deepe Well; For then it Cureth the

the Rawnesse of the Water; But Chalkie Water, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloaths, which weare out apace, if you use such Waters.

395

Fifthly, the Housewives doe finde a Difference in Waters, for the Bearing or Not Bearing of Soape: And it is likely that the more Fat Water will beare Soape best; For the Hungry water doth kill the Unctuous Nature of the Soape.

396

Sixthly, you may make a Judgement of Waters, according to the Place, whence they Spring, or Come: The Raine-Water is, by the Physicians esteemed the Finest, and the best; But yet it is said to putrifie soonest; which is likely, because of the Finenesse of the Spirit: And in Conservatories of Raine-water, (such as they have in Venice, &c.) they are found not so Choice Waters; The worse, (perhaps,) because they are Covered aloft, and kept from the Sunne. Snow-water is held unwholesome, in so much as the People, that dwell at the Foot of the Snow-Mountaines, or otherwise upon the Ascent, (especially the Women,) by drinking of Snow-water, have great Bagges hanging under their Throats. Well-water, except it be upon Chalke, or a very plentiful Spring, maketh Meat Red; which is an ill Signe. Springs on the Tops of High-Hills are the best: For both they seeme to have a Lightnesse, and Appetite of Mounting; And besides they are most pure and unmingled; And againe, are more Percolated thorow a great space of Earth. For Waters in Valleys, joyne in effect under Ground with all Waters of the same Levell; Whereas Springs on the Tops of Hills, passe thorow a great deale of Pure Earth, with lesse Mixture of other Waters.

397

Seventhly, Judgement may be made of Waters by the Soyle whereupon the Water runneth; As Pebble is the Cleanest, and best tasted; And next to that Clay-water; And Thirdly, Water upon Chalke; Fourthly, that upon Sand; And Worst of all upon Mudd. Neither may you trust Waters that Taste Sweet; For they are commonly found in Rising Grounds of great Cities; which must needs take in a great deale of Filth.

IN Peru, and divers Parts of the West-Indies, though under the Line, the Heats are not so Intolerable, as they be in Barbary, and the Skirts of the Torrid Zone. The Causes are, First, the Great Brizes, which the Motion of the Aire in great Circles, (such as are under the Girdle of the world,) produceth; Which doe refrigerate; And therefore in those Parts Noone is nothing so hot, when the Brizes are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another Cause is, for that the Length of the Night, and the Dewes thereof, doe compensate the Heat of the Day. A third Cause is the Stay of the Sunne; Not in Respect of Day and Night, (for that wee spake of before,) but in Respect of the Season; For under the Line, the Sunne crosseth the Line, and maketh two Summers, and two Winters; But in the Skirts of the Torrid Zone, it doubleth, and goeth back againe, and so maketh one Long Summer.

Experiment
Solitary touch-
ing the
Temperate
Heat under
the Equino-
ctiall.

398

THE Heat of the Sunne maketh Men Blacke in some Countries, as in Ethiopia, and Giny, &c. Fire doth it not, as wee see in Glasse-Men, that are continually about the Fire. The Reason may be, because Fire doth lick up the Spirits, and Bloud of the Body, so as they Exhale; So that it ever maketh Men looke Pale and Sallow; But the Sunne, which is a Gentler Heat, doth but draw the Bloud to the Outward Parts; And rather Concocteth it, than Soaketh it: And therefore wee see that all

Experiment
Solitary touch-
ing the Co-
loration of
Blacke and
Tawny
Moor.

399

Ethiopes are Fleſhy, and Plumpe, and have great Lips; All which betoken *Moifture* retained, and not drawne out. We ſee alſo, that the *Negroes* are bred in Countries that have plenty of *waier*, by *Rivers*, or otherwiſe: For *Meroë*, which was the *Metropolis* of *Ethiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of *Rivers*. And the *Confin*es of the River *Niger*, where the *Negroes* alſo are, are well watered: And the Region about *Capo Verde*, is likewiſe *Moift*, in ſo much as it is peſtilent through *Moifture*: But the Countries of the *Abyſſenes*, and *Barbary*, and *Peru*, where they are *Tawney*, and *Olivaſter*, and *Pale*, are generally more *Sandy*, and *Dry*. As for the *Ethiopes*, as they are *Plumpe*, and *Fleſhy*; So (it may be) they are *Sanguine*, and *ruddy*, Coloured, if their black *Skinne* would ſuffer it to be ſcene.

Experiment
Solitary touch-
ing Motion
after the In-
ſtant of Death.

400

Some *Creatures* doe move a good while after their *Head* is off; As *Birds*; Some a very little time; As *Men*, and all beaſts; Some move, though cut in ſeverall *Pieces*; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. Firſt therefore it is certaine, that the *Immediate Cauſe* of *Death*, is the *Reſolution* or *Extinguiſhment* of the *Spirits*; And that the *Deſtruction* or *Corruption* of the *Organs*, is but the *Mediate Cauſe*. But ſome *Organs* are ſo peremptorily neceſſary, that the *Extinguiſhment* of the *Spirits* doth ſpeedily follow; But yet ſo, as there is an *Interim* of a *Small Time*. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beaſt* hath lowed, after the *Heart* hath bene ſevered; And it is a Report alſo of Credit, that the *Head* of a *Pigge* hath bene opened, and the *Braine* put into the *Palme* of a *Mans* hand, trembling, without breaking any part of it, or ſevering it from the *Marrow* of the *Back-bone*; During which time the *Pigge* hath bene, in all appearance, ſtarke dead, and without *Motion*; And after a *ſmall Time* the *Braine* hath bene replaced, and the *Skull* of the *Pigge* cloſed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* upon *Revenge* hath been thruſt forth, ſo as it hangd a pretty diſtance by the *Viſuall Nerve*; And during that time the *Eye* hath bene without any *Power of Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beaſts* are *Large*; And therefore, when the *Head* is off, they move little or nothing. But *Birds* have *ſmall Heads*, and therefore the *Spirits* are a little more diſperſed in the *Sinewes*, whereby *Motion* remaineth in them a little longer; In ſo much as it is Extant in *Story*, that an *Emperour of Rome*, to ſhew the Certainty of his *Hand*, did Shoot a great Forked Arrow at an *Eſtrich*, as ſhe ran ſwiftly upon the *Stage*, and ſtrook off her *Head*; And yet ſhe continued the *Race*, a little way, with the *Head* off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffuſed almoſt all over; And therefore they move in their *Severall Pieces*.

NATU-



NATVRALL HISTORIE.

V. Century.



WE will now enquire of *Plants* or *Vegetables*: And wee ſhall doe it with diligence. They are the principall Part of the *Third Dayes Worke*. They are the firſt *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Eſſence*; And they are of excellent and generall Uſe, for *Food*, *Medicine*, and a Number of *Mechanicall Arts*.

There were ſowen in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *Wheat*, *Cucumber-Seed*, and *Peaſe*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horſe-dung*, old, and well rotted; This was laid upon a Banke, halfe a foot high, and ſupported round about with *Planks*; And upon the Top was caſt *Sifted Earth*, ſome two Fingers deepe; And then the *Seed* ſprinkled upon it, having been ſteeped all night in *Water* Mixed with *Com-dung*. The *Turnip-Seed*, and the *Wheat* came up halfe an Inch above *Ground*, within two dayes after, without any *Watring*. The Reſt the third day. The Experiment was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have been the ſpeedier. This is a Noble Experiment, For without this helpe, they would have bene ſoure times as long in coming up. But there doth not occurre to me, at this preſent, any uſe thereof, for profit; Except it ſhould be for *Sowing of Peaſe*, which have their price very much increaſed, by the early *Comming*. It may be tried alſo with *Cherries*, *Strawberries*, and other *Fruit*, which are deareſt, when they come early.

There was *Wheat*, ſteeped in *Water* mixed with *Com-dung*; Other in *Water* mixed with *Horſe-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Urine of Man*; Other in *Water* mixed with *Chalke* powdered; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Aſhes*; Other in *Wa-*

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ter

Experiment
in Conſort,
touching the
Acceleration of
Germination.

401

402

ter mixed with Bay-Salt; Other in Claret Wine; Other in Malmsey; Other in Spirit of Wine. The Proportion of the Mixture was, a fourth Part of the Ingredients to the Water; Save that there was not of the Salt above an eighth Part. The Urine, and Wines, and Spirit of Wine, were Simple without Mixture of Water. The Time of the Steeping was twelve houres. The Time of the Yeare October. There was also other wheat sown unsteept, but watered twice a day with warm water. There was also other wheat sown simple to compare it with the rest. The Event was, that those that were in the Mixture of Dung, and Urine, and Soor, Chalke, Ashes, and Salt, came up within sixe dayes: And those that afterwards proved the Highest, Thickest, and most Lustie, were, first the Urine, And then the Dungs; Next the Chalke; Next the Soor; Next the Ashes; Next the Salt; Next the wheat simple of it selfe, unsteept, and unwatered; Next the Watered twice a day with warme water; Next the Claret Wine. So that these three last were slower than the Ordinary wheat of it selfe; And this Culture did rather retard, than advance. As for those that were steeped in Malmsey, and Spirit of Wine, they came not up at all. This is a Rich Experiment for Profit; For the most of the Steepings are Cheape Things; And the goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming up: As it is like it will; Both being from the Vigour of the Seed; Which also partly appeared in the Former Experiments, as hath beene said. This Experiment would be tried in other Grains, Seeds, and Kernells: For it may be some Steeping will agree best with some Seeds. It would be tried also in severall Seasons of the Yeare, especially the Spring.

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Strawberries watered now and then, (as once in three dayes,) with Water, wherein hath beene steeped Sheepes-dung, or Pigeons-dung, will prevent and come early. And it is like the same Effect would follow in other Berries, Herbs, Flowers, Graines, or Trees. And therefore it is an Experiment, though vulgar in Strawberries, yet not brought into use generally: For it is usuall to helpe the Ground with Mucke; And likewise to Recomfort it sometimes with Muck put to the Roots; But to water it with Muck water, which is like to be more Forcible, is not practised.

404

Dung, or Chalke, or Bloud, applied in Substance, (seasonably,) to the Roots of Trees, doth set them forwards. But to doe it unto Herbs, without Mixture of Water or Earth, it may be these helps are too Hot.

405

The former Meanes of Helping Germination, are either by the Goodnesse and Strength of the Nourishment; Or by the Comforting, and Exciting the Spirits in the Plant, to draw the Nourishment better. And of this latter kinde, concerning the Comforting of the Spirits of the Plant, are also the experiments that follow; Though they be not Applications to the Root, or Seed. The Planting of Trees warme upon a wall, against the South, or South-East Sunne, doth hasten their Comming on, and Ripening; And the South-East is found to be better than the South-West, though the South-West be the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succeedeth the Cold of the Night: and partly, because, (many times) the South-West Sunne is too Parching. So likewise the Planting of them upon the Back of a Chimney where a Fire is kept, doth hasten their Comming on, and Ripening: Nay more, the Drawing of the Boughes into the Inside of a Roome, where a Fire is continually kept, worketh the same Effect; which hath beene tried with Grapes; In so much as they will come a Moneth earlier, than the Grapes abroad.

Besides

Besides the two Meanes of Accelerating Germination, formerly described; That is to say, the Mending of the Nourishment; Comforting of the Spirit of the Plant; there is a Third; Which is the Making way for the Easie Comming to the Nourishment, and Drawing it. And therefore Gentle Digging and Loosening of the Earth about the Roots of Trees; And the Removing Herbs and Flowers into new Earth, once in two yeares, (which is the same thing; For the new Earth is ever looser,) doth greatly further the Profpering, and Earlinesse of Plants.

But the most admirable Acceleration by Facilitating the Nourishment, is that of Water. For a Standard of a Damaske Rose with the Root on, was set in a Chamber, where no Fire was, upright in an Earthen Pan, full of Faire Water, without any Mixture, halfe a foot under the Water, the Standard being more than two Foot high above the Water: Within the Space of ten dayes, the Standard did put forth a faire Greene leafe, and some other little Buds, which stood at a stay, without any Shew of decay or withering, more than seven Dayes. But afterwards that Leafe faded, but the young Buds did sprout on, which afterward opened into fair Leaves, in the space of three Moneths: And continued so a while after, till upon Removall we left the Triall. But note that the Leaves were somewhat paler, & lighter-colored, than the Leaves use to be abroad. Note that the first Buds were in the End of October; And it is likely that if it had beene in the Spring time, it would have put forth with greater strength, and (it may be) to have growne on to beare Flowers. By this Meanes, you may have, (as it seemeth,) Roses set in the midst of a Poole, being supported with some stay; Which is Matter of Rarenesse and Pleasure, though of small Use. This is the more strange, for that the like Rose-standard was put, at the same time, into Water mixed with Horse-dung, the Horse-dung about the fourth Part to the Water, and in foure Moneths space (while it was observed) put not forth any Leafe, though divers Buds at the first, as the other.

A Dutch Flower, that had a Bulbous Root, was likewise put, at the same time, all under Water, some two or three Fingers deep; And within seven dayes sprouted, and continued long after, further Growing. There were also put in, a Beet-Root, a Borrage-Root, and a Raddish-Root, which had all their Leaves cut almost close to the Roots; And within six weekes had faire Leaves; And to continued, till the end of November.

Note that if Roots, or Pease, or Flowers, may be Accelerated in their Comming and Ripening, there is a double Profit; The one in the high Price that those Things beare when they come early: The other in the Swiftnesse of their Returnes: For in some Grounds which are strong, you shall have a Raddish, &c. come in a Moneth; That in other Grounds will not come in two; And to make double Returnes.

Wheat also was put into the Water, and came not forth at all; So as it seemeth there must be some Strength and Bulke in the Body, put into the Water, as it is in Roots; For Graines, or Seeds, the Cold of the Water will mortifie. But casuall some wheat lay under the Pan, which was somewhat moistened by the Suing of the Pan; which in six weekes (as afore-said) looked mouldy to the Eye, but it was sprouted forth halfe a Fingers length.

It seemeth by these Instances of Water, that for Nourishment, the Water is almost all in all, and that the Earth doth but keepe the Plant upright, and save it from Over-heat, and Over-cold; And therefore is a Comfortable Experiment for good Drinkers. It proveth also that our former Opinion; That

Drinke

Drinke incorporate with Flesh, or Roots, (as in Capon-Beere, &c.) will nourish more easily, than Meate and Drinke taken severally.

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The *Housing of Plants* (I conceive) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seasons*: And as we *House* *Hot Countrey Plants*, as *Lemons, Oranges, Myrtles*, to save them; So we may *House* our own *Countrey Plants*, to forward them, and make them come in the *Cold Seasons*; In such sort, that you may have *Violets, Strawberryes, Pease*, all *Winter*: So that you sow, or remove them at fit times. This *Experiment* is to be referred unto the *Comforting of the Spirit of the Plant*, by *Warmth*, as well as *Housing* their *Boughs*, &c. So then the *Meanes* to *Accelerate Germination*, are in *Particular* eight, in *Generall* three.

Experiments
in Comfort,
touching the
Pausing backe
or Retardation
of Germination.

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TO make *Roses*, or other *Flowers* come late, it is an *Experiment of Pleasure*. For the *Ancients* esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, having been lesse exhale by the *Sunne*. The *Meanes* are these. First, the *Cutting off their Tops*, immediately after they have done *Bearing*; And then they will come againe the same yeare about *November*: But they will not come just on the *Tops*, where they were cut, but out of those *Shoots*, which were (as it were,) *Water-Boughs*. The *Cause* is, for that the *Sap*, which otherwise would have fed the *Top*, (though after *Bearing*) will, by the discharge of that, divert unto the *Side-Sprouts*; And they will come to beare, but later.

414

The *Second* is the *Pulling off the Buds of the Rose*, when they are *Newly knotted*; For then the *Side-Branches* will beare. The *Cause* is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds* worke the same *Effect*, in *Retention of the Sap* for a time, and *Diverſion of it to the Sprouts*, that were not so forward.

415

The *Third* is the *Cutting off some few of the Top-Boughes* in the *Spring-time*, but suffering the lower *Boughes* to grow on. The *Cause* is, for that the *Boughes* doe helpe to draw up the *Sap* more strongly; And we see that in *Powling of Trees*, many doe use to leave a *Bough* or two on the *Top*, to helpe to draw up the *Sap*. And it is reported also, that if you graft upon the *Bough of a Tree*, and cut off some of the old *Boughes*, the new *Cions* will perish.

416

The *Fourth* is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plaine, for that it doth arrest the *Sap*, from going upwards, for a time; Which *Arrest* is afterwards released by the *Covering of the Root* againe with *Earth*; And then the *Sap* getteth up, but later.

417

The *Fifth* is the *Removing of the Tree*, some *Moneth* before it *Buddeth*. The *Cause* is, for that some time will be required after the *Remove*, for the *Resetling*, before it can draw the *Juyce*; And that time being lost, the *Bloſſome* must needs come forth later.

418

The *Sixth* is the *Grafting of Roses in May*, which commonly *Gardiners* doe not till *July*; And then they beare not till the *Next Yeare*; But if you graft them in *May*, they will beare the same yeare, but late.

419

The *Seventh* is, the *Girding of the Body of the Tree* about with some *Pack-threed*; For that also in a degree, restraineth the *Sap*, and maketh it come up more late, and more slowly.

420

The *Eighth* is, the *Planting of them in a Shade*, or in a *Hedge*; The *Cause* is, partly the *Keeping out of the Sunne*, which hasteneth the *Sap* to rise; And partly the *Robbing of them of Nourishment*, by the *Stuffe in the Hedge*. These *meanes* may be practised upon other, both *Trees* and *Flowers*, *Mutatis Mutandis*.

Men

Men have entertained a *Conceit* that sheweth prettily; Namely, that if you graft a *Late-Coming Fruit*, upon a *Stocke of a Fruit-Tree* that *Commeth early*, the *Graft* will beare *Fruit Early*; As a *Peach* upon a *Cherry*; And contrariwise, if an *Early-Coming-Fruit* upon a *Stock of a Fruit-Tree* that *Commeth late*, the *Graft* will beare *Fruit late*; As a *Cherry* upon a *Peach*. But these are but *Imaginations*, and untrue. The *Cause* is, for that the *Cions* overruleth the *Stock* quite; And the *Stock* is but *Passive* onely, and giveth *Aliment*, but no *Motion* to the *Graft*.

Wee will speake now, how to make *Fruits, Flowers*, and *Roots* larger; in more plenty; and sweeter; than they use to be; And how to make the *Trees* themselves, more *Tall*; more *Spread*; and more *Hasty* and *Sudden*; than they use to be. Wherein there is no doubt, but the former *Experiments of Acceleration*, will serve much to these *Purposes*. And again, that these *Experiments*, which we shall now set downe, doe serve also for *Acceleration*; because both *Effects* proceed from the *Encrease of vigour in the Tree*; But yet to avoid *Confusion*; And because some of the *Means* are more proper for the one *Effect*, and some for the other, we will handle them apart.

It is an assured *Experience*, that an *Heape of Flint*, or *Stone*, laid about the *Bottom of a Wilde-Tree*, (as an *Oake, Elme, Ash, &c.*) upon the first *Planting*, doth make it prosper double as much, as without it. The *Cause* is, for that it retaineth the *Moisture*, which falleth at any time upon the *Tree*, and suffereth it not to be exhale by the *Sunne*. Again, it keepeth the *Tree* warme, from *Cold Blasts* and *Frosts*, as it were in an *House*. It may be also, there is somewhat in the *Keeping of it steady at the first*. *Quere*, if *Laying of Straw* some *Height* about the *Body of a Tree*, will not make the *Tree* forwards. For though the *Root* giveth the *Sap*, yet it is the *Body* that draweth it. But you must note, that if you lay *Stones* about the *stake of Lettuce*, or other *Plants*, that are more soft, it will over-Moisten the *Roots*, so as the *Wormes* will eate them.

A *Tree*, at the first *Setting*, should not be *Shaken*, untill it hath taken *Root fully*: And therefore some have put two little *Forkes* about the *Bottom of their Trees*, to keep them upright; But after a yeares *Rooting*, then *Shaking* doth the *Tree good*, by *Loosening of the Earth*, and (perhaps) by *Exercising* (as it were) and *Stirring the Sap of the Tree*.

Generally, the *Cutting away of Boughes and Suckers* at the *Root and Body*, doth make *Trees* grow high; And contrariwise, the *Powling and Cutting of the Top*, maketh them grow spread, and bushy. As we see in *Pollards, &c.*

It is reported, that to make *hasty Growing Coppice-Woods*, the way is, to take *Willow, Sallow, Poplar, Alder*, of some seven yeares growth; And to set them, not upright, but a *slope*, a reasonable depth under the *Ground*; And then, in stead of one *Root*, they will put forth many, and so carry more *Shoots* upon a *Stemme*.

When you would have many new *Roots of Fruit-Trees*, take a *Low Tree*, and bow it, and lay all his branches a-flat upon the *Ground*, and cast *Earth* upon them; And every *Twigge* will take *Root*. And this is a very profitable

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Experiments
in Comfort,
touching the
Acceleration of
Fruits, Trees,
and Plants.

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ble Experiment for Costly Trees; (for the Boughes will make Stockes without charge;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.* The like is continually practised with *Vines, Roses, Muske-Roses, &c.*

From May to July you may take off the Barke of any Bough, being of the Bignesse of three or foure Inches, and cover the bare Place, somewhat above, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the Bough about *Alballonside* in the bare Place, and set it in the Ground; And it will grow to be a faire Tree in one Year. The Cause may be, for that the Baring from the Barke keepeth the Sap from descending towards Winter, and so holdeth it in the Bough; And it may bee also that the Loam and Horse-dung applyed to the bare place, doe moisten it; and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the Sap of Trees in their Boughes; Which may serve to other Effects.

It hath been practised in Trees, that shew faire, and beare not, to Bore a Holet thorow the Heart of the Tree, and thereupon it will beare. Which may be, for that the Tree before had two much Repletion, and was oppressed with his owne Sap; For Repletion is an Enemie to Generation.

It hath beene practised in Trees, that doe not beare, to cleave two or three of the Chiefe Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The Cause may be, for that a Root of a Tree may be (as it were,) Hide-bound, no lesse than the Body of the Tree; but it will not keep open without somewhat put into it.

It is usually practised, to set Trees that require much Sunne, upon Walls against the South; As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double Commoditie: The one, the Heat of the Wall by Reflexion; The other, the Taking away of the Shade; For when a Tree groweth round, the upper Boughes over-shadow the lower: But when it is spread upon a Wall, the Sunne commeth alike, upon the upper, and lower Branches.

It hath also been practised (by some) to pull off some Leaves from the Trees so spread, that the Sunne may come upon the Bough and Fruit the better. There hath been practised also a Curiosity, to set a Tree upon the North-Side of a Wall, and at a little height, to draw him thorow the Wall, and spread him upon the South-Side: Conceiving that the Root and lower Part of the Stocke should enjoy the Freshnesse of the Shade; And the Upper Boughes and Fruit, the Comfort of the Sunne. But it sorteth not; The Cause is, for that the Root requireth some Comfort from the Sunne, though under Earth, as well as the Bodie: And the Lower Part of the Bodie more than the Upper, as wee see in Compassing a Tree below with straw.

The Lownesse of the Bough, where the Fruit commeth, maketh the Fruit greater, and to ripen better; For you shall ever see in *Apricots, Peaches, or Melo-Corones*, upon a wall, the greatest Fruits towards the Bottome. And in France the Grapes that make the wine, grow upon low Vines, bound to small Stakes. And the raised Vines in Arbours make but Verjuice. It is true, that in Italy, and other Countreies, where they have hotter Sunne, they raise them upon *Elmes*, and Trees; But I conceive, that if the French Manner of Planting low, were brought in use there, their Wines would be stronger and sweeter. But it is more chargeable in respect of the Props. It were good to see whether a Tree grafted somewhat neare the Ground, and the lower boughes onely maintained, and the higher continually pruned off, would not make a larger Fruit.

To have Fruit in Greater Plentie, the way is, to graft, not only upon young Stocks, but upon divers Boughes of an old Tree; for they will beare great Numbers of Fruit; Whereas if you graft but upon one Stocke, the Tree can beare but few.

The Digging yearly about the Roots of Trees, which is a great meanes, both to the Acceleration and Melioration of Fruits, is practised in nothing but in Vines; Which if it were transferred unto other Trees, and Shrubs, (as *Roses, &c.*) I conceive would advance them likewise.

It hath beene knowne, that a Fruit-Tree hath beene blown up (almost) by the Roots, and set up againe, and the next yeare bare exceedingly. The Cause of this, was nothing but the Loosening of the Earth, which comforteth any Tree, and is fit to be practised, more than it is, in Fruit-Trees: For Trees cannot be so fitly removed into New Grounds, as Flowers and Herbs may.

To revive an Old Tree, the Digging of it about the Roots, and Applying new Mould to the Roots, is the Way. We see also that Draught-Oxen, put into fresh Pasture, gather new and tender Flesh; And in all Things, better Nourishment than hath been used, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former.

If an Herbe be cut off from the Roots, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the Roots will become of very great Magnitude in Summer. The Reason is, for that the Moisture being forbidden to come up in the Plant, stayeth longer in the Root, and so dilateth it. And Gardiners use to tread downe any loose Ground, after they have sowne *Onions, or Turnips, &c.*

If *Panicum* be laid below, and about the Bottome of a Root, it will cause the Root to grow to an Excessive Bignesse. The Cause is, for that being it selfe of a Spungy Substance, it draweth the Moisture of the Earth to it, and so feedeth the Root. This is of greatest use for *Onions, Turnips, Parsnips, and Carrets.*

The Shifting of Ground is a Meanes to better the Tree and Fruit; But with this Caution; That all Things doe prosper best, when they are advanced to the better: Your Narserie of Stocks ought to be in a more Barten Ground, than the Ground is whereunto you remove them. So all Grasers preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it leaveth a Cherishing to the better, of the Body, in Age: Nay in Exercises, it is good to begin with the hardest, as Dancing in Thicke Shooes, &c.

It hath beene observed, that Hacking of Trees in their Barke, both downe-right, and across, so as you make them rather in slices, than in continued Hacks, doth great good to Trees; And especially delivereth them from being Hide-bound, and killeth their Mousse.

Shade to some Plants conduceth to make them large and prosperous, more than Sun: As in *strawberries*, and *Bayes, &c.* Therefore amongst *strawberries*, sow here and there some *Borrage Seed*; And you shall finde the *strawberries* under those Leaves farre more large than their Fellowes. And *Bayes* you must plant to the North; Or defend them from the Sunne by a Hedge-Row; And when you sow the *Berries*, weed not the Borders, for the first halfe yeare; For the weed giveth them Shade.

To increase the Crops of Plants, there would be considered, not onely the Increasing the East of the Earth, or of the Plant, but the Saving also of that which is spilt. So they have lately made a Trail, to see what; which nevertheless

443 Nevertheless hath beene leſſe off, becauſe of the trouble and paines ; Yet ſo much is true, that there is much ſaved by the *ſetting*, in compariſon of that which is *ſown*, both by keeping it from being picked up by Birds, And by Avoiding the Shallow lying of it, whereby much that is ſown taketh no Root.

444 It is reported by ſome of the *Ancients*, that you take *Small Trees*, upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the Middle of *Autumne* with dung, untill the Spring ; And then take them up on a warme day, and replant them in good Ground ; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth ; when other *Trees* of the ſame kinde, doe but bloſſome. But this ſeemeth to have no great Probabilitie.

445 It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thickneſſe of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will ſpring forth within eight dayes. The *Cauſe* is like to be, (if the Experiment be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre* ; For *Nitre* is (as it were) the Life of *Vegables*.

446 Take *Seed*, or *Kernells* of *Apples*, *Pearres*, *Orenges* ; Or a *Peach*, or a *Plum-ſtone*, &c. And put them into a *Squill* (which is like a great *Onion*), and they will come up much earlier than in the *Earth* it ſelf. This I conceive to be as a Kinde of *Grafting* in the *Roots*. For as the *Stock* of a *Graft* yeeldeth better prepared Nouriſhment to the *Graft*, than the *Crude Earth* ; So the *Squill* doth the like to the *Seed*. And I ſuppoſe the ſame would be done, by putting *Kernells* into a *Turp*, or the like ; Save that the *Squill* is more Vigorous, and Hot. It may be tried alſo, with putting *Onion-Seed* into an *Onion-Bud*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

447 The Pricking of a *Fruit* in ſeverall places, when it is almoſt at his Bigneſſe, and before it ripeneth, hath beene praſiſed with ſucceſſe, to ripen the *Fruit* more ſuddenly. We ſee the Example of the Biting of *Wafſes*, or *Wormes*, upon *Fruit*, whereby it (maniſtly) ripeneth the ſooner.

448 It is reported, that *Alga Marina* (Sea-Weed) put under the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertilite.

449 It hath beene praſiſed, to cut off the *Stalkes* of *Cucumbers*, immediately after their *Bearing*, cloſe by the *Earth*, And then to caſt a pretty Quantity of *Earth* upon the *Plant* that remaineth, and they will bear the next year *Fruit*, long before the ordinarie time. The *Cauſe* may be, for that the *Sap* goeth down the ſooner, and is not ſpent in the *Stalke* or *Leafe*, which remaineth after the *Fruit* ; Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annual*, ſeemeth to be partly cauſed by the Over-Expende of the *Sap* into *Stalke* and *Leaves* ; which being prevented, they will ſuper-annate, if they ſtand warme.

450 The Pulling off many of the *Blaſſomes* from a *Fruit-Tree*, doth make the *Fruit* ſmaller. The *Cauſe* is maniſt, For that the *Sap* hath the leſſe to nouriſh. And it is a Common Experience, that if you doe not pull off ſome *Blaſſomes*, the firſt time a *Tree* bloſſometh, it will bloſſome it ſelfe to death.

451 It is good to trie, what would be the Effect, if all the *Blaſſomes* were pulled from a *Fruit-Tree* ; Or the *Acornes*, and *Cheſnut-buds*, &c. from a *Wilde Tree* for two yeares together. I ſuppoſe that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit* ; Or elſe, the ſame yeares, larger *Leaves*, becauſe of the *Sap* ſtored up.

It

451 It hath beene generally received, that a *Plant* watered with *Warne Water*, will come up ſooner and better, than with *Cold Water*, or with *Showers*. But our Experiment of *Watering Wheat* with *Warne Water* (as hath beene ſaid) ſucceeded not ; which may be, becauſe the *Triall* was too late in the *Yeare*, viz. in the End of *October*. For the *Cold* then coming upon the *Seed*, after it was made more tender by the *Warne Water*, might checke it.

452 There is no doubt, but that *Grafting* (for the moſt Part) doth meliorate the *Fruit*. The *Cauſe* is maniſt ; For that the Nouriſhment is better prepared in the *Stock*, than in the *Crude Earth* : But yet note well, that there be ſome *Trees*, that are ſaid to come up more happily from the *Kernell*, than from the *Graft* ; As the *Peach*, and *Melocotone*. The *Cauſe* I ſuppoſe to be, for that thoſe *Plants* require a Nouriſhment of great Moiſture ; And though the Nouriſhment of the *Stock* be finer, and better prepared, yet it is not ſo moiſt, and plentifull, as the Nouriſhment of the *Earth*. And indeed we ſee thoſe *Fruits* are very *Cold* *Fruits* in their Nature.

453 It hath beene received, that a *Smaller Peare*, grafted upon a *Stock* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* upon the *Late Stock* ; And e controuerſe ; which we rejected before : For the *Cions* will governe. Nevertheleſſe it is probable enough, that if you can get a *Cion* to grow upon a *Stock* of another kinde, that is much moiſter than his own *Stock*, it may make the *Fruit* Greater, becauſe it will yeeld more plentifull Nouriſhment ; Though it is like it will make the *Fruit* Baſer. But generally the *Grafting* is upon a drier *Stock* ; As the *Apple* upon a *Crab* ; The *Peare* upon a *Thorne* ; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cion* upon the *Stock* of a *Colewort*, and it will beare a great flaggy *Apple* ; The *Kernell* of which, if it be ſet, will be a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cion* will prosper, if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elme*, or upon an *Horſe-Plumme*, which are the moiſteſt of *Trees*. I have heard that it hath beene tried upon an *Elme*, and ſucceeded.

454 It is maniſt by Experience, that *Flowers* Removed wax greater, becauſe the Nouriſhment is more eaſily come by, in the looſe *Earth*. It may be, that Off *Regrafting* of the ſame *Cions*, may likewiſe make *Fruit* greater ; As if you take a *Cion*, and graft it upon a *Stock* the firſt yeare ; And then cut it off, and graft it upon another *Stock* the ſecond yeare ; and ſo for a third ; Or fourth yeare ; And then let it reſt, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of *Grafting* there are many Experiments worth the Noting, but thoſe we reſerve to a proper Place.

455 It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth *Leaves*, have his *Top* cut off. The *Cauſe* is plaine, for that the *Sap* hath the leſſe to feed, and the leſſe way to mount : But it may be, the *Figge* will come ſomewhat later, as was formerly touched. The ſame may be tried likewiſe in other *Trees*.

456 It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Tranke* of the *Tree* thorow, in ſeverall places, and thruſt into the Places bored, *Wedges* of ſome Hot *Trees*, as *Turpentine*, *Maſtick-Tree*, *Guaiacum*, *Juniper*, &c. The *Cauſe* may be, for that *Adventive Heat* doth cheare up the Native *Juyce* of the *Tree*.

457 It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees of Wine*, or *Bloud* to the *Root*. The *Cauſe* may be the Encreaſing

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creaſing

creasing the Lust or Spirit of the Root; These Things being more forcible, than ordinary Composts.

It is reported by one of the Ancients, that *Artichokes* will be lesse prickly, and more tender, if the *Seeds* have their Tops dulled, or grated off upon a Stone.

Herbs will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come up, and remove them into *Pots*, with better *Earth*. The *Remove* from *Bed* to *Bed* was spoken of before; But that was in severall *years*; This is upon the sudden. The *Cause* is the same with other *Removes*, formerly mentioned.

Coleworts are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watered with *Salt-water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adurent than *Salt*.

It is reported, that *Cucumbers* will prove more Tender, and Dainty, if their *Seeds* be Steeped (a little) in *Milke*; The *Cause* may be, for that the *Seed* being mollified with the *Milke*, will be too weak to draw the grosser Juyce of the *Earth*, but onely the finer. The same *Experiment* may be made in *Artichokes*, and other *Seeds*, when you would take away, either their *Flashiness*, or *Bitterness*. They speake also, that the like Effect followeth, of Steeping in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too Quicke a Spirit.

It is reported that *Cucumbers* will be lesse *warie*, and more *Melon-like*, if in the *Pit* where you set them, you fill it (half way up) with *Chaffe*, or small *Sticks*, and then pour *Earth* upon them; For *Cucumbers*, as it seemeth, doe extremely affect *Moisture*; And over-drinke themselves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is grown, you set a *Pot* of water about five or six Inches distance from it, it will, in 24. houres, shoot so much out, as to touch the *Pot*; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *File*: For it discovereth *Perception* in *Plants*, to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is farre more strange: It is, that if you set a *Stake*, or *Prop*, some distance from it, it will grow that way; Which is farre stranger (as is said) than the other. For that *Water* may worke by a *Sympathie* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

It hath been touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receive *Aliment* sufficient; And yet no more than they can well turne, and digest; And withall doe sweat out the coarsest and unprofitablest Juyce; Even as it is in *Living Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habite of Body.

As *Terebration* doth *Meliorate Fruits*, so, upon the like reason, doth *Letting* of *Plants* *Blind*; As *Pricking Vines*, or other *Trees*, after they be of some Growth; And thereby letting forth *Gumme*, or *Tears*; Though this be not so common, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Sugar Almonds* have beene turned into *Sweet*.

The *Ancients* for the *Relaxing* of *Fruit*, doe commend *Swines-Dung* above all other *Dung*; Which may be, because of the *Moisture* of that *Dung*, whereby the *Excrement* hath lesse Acrimony; For we see *Swines* and *Pigs* flesh in the thickest of *Flethes*.

It is observed by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be growne up some reasonable time, they be cut, and so you take the later Sprout. The *Cause* may be for that the longer the Juyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe *Causes*, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaves*, is the length of time, in which they grow to *Maturity*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing.

As *Grafting* doth generally advance and *Meliorate Fruits*, above that which they would be, if they were set of *Kernels*, or *Stones*, in regard the *Nourishment* is better concocted; So (no doubt) even in *Grafting*, for the same cause, the Choyce of the *Stocks* doth much; Always provided, that it bee somewhat inferiour to the *Cions*. For otherwise it dulseth it. They commend much the *Grafting* of *Pears*, or *Apples*, upon a *Quince*.

Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (especially laid up together for a Moneth or two,) is a very great Nourisher, and Comforter to a *Fruit-Tree*.

It is delivered, that *Onions* wax greater, if they be taken out of the *Earth*, and laid a drying twenty dayes, and then set againe; And yet more, if the outermost *Pill* be taken off all over.

It is delivered by some, that if one take the *Bough* of a *Low-Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen Pot* perforate at the bottome to let in the *Plant*, and then cover the *Pot* with *Earth*, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Poising* of *Plants*, without Removing, and Leaving the *Fruit* in the *Earth*. The like, (they say,) will be effected, by an *Empty Pot* without *Earth* in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if some few *Pertusions* be made in the *Pot*. Wherein, besides the *Defending* of the *Fruit*, from *Extremity* of *Sunne* or *Weather*, some give a reason, that the *Fruit*, Loving and Coveting the open *Aire* and *Sunne*, is invited by those *Pertusions*, to spread and approach, as neare the open *Aire*, as it can; And so enlargeth in *Magnitude*.

All *Trees*, in *High* and *Sandy Grounds*, are to be set deep; And in *Warry Grounds*, more shallow. And in all *Trees*, when they be removed (especially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coated, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that seemeth to have lesse reason; Because the *Stoney*eth not so neare the *Sunne*, as the *Tree* groweth.

Timber Trees in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot up still in Height; And chiefly because they are defended from too much *Sunne* and *Winde*, which doe checke the Growth of all *Fruits*; And so (no doubt) *Fruit-Trees*, or *Vines*, set upon a *Wall*, against the *Sunne*, betwene *Elbowes* or *Buttresses* of *Stone*, ripen more, than upon a *Plain Wall*.

It is said, that if *Potatoe Roots*, be set in a *Pot* filled with *Earth*, and then the *Pot* with *Earth* be set likewise within the Ground, some two or three Inches, the *Roots* will grow greater, than Ordinary. The *Cause* may be, for that Having *Earth* enough within the *Pot* to nourish them; And then being stopped by the Bottome of the *Pot* from putting *Strings* downward, they must needs grow greater in Breadth, and Thickness. And it may be, that

that all *Seeds* or *Roots*, *Potted*, and so let into the *Earth*, will prosper the better.

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The *Cutting off the Leaves* of *Radish*, or other *Roots*, in the beginning of *Winter*, before they wither; And *Covering* againe the *Root*, somthing high with *Earth*; Will preserve the *Root* all *Winter*, and make it bigger, in the *Spring* following, as hath beene partly touched before. So that there is a double Use of this *Cutting off the Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by *Strengthening the Root*, it will make the *Fruit* also the greater.

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It is an *Experiment* of great pleasure, to make the *Leaves* of *Shady Trees*, larger than ordinary. It hath beene tryed (for certaine) that a *Cions* of a *Weech-Elme*, grafted upon the *Stocke* of an Ordinary *Elme*, will put forth *Leaves*, almost as broad as the *Brimme* of ones *Hat*. And it is very likely, that as in *Fruit-Trees*, the *Grass* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaves*. It would be tried therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the *Leafe*.

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The *Barrenesse* of *Trees*, by *Accident*, (besides the *Weaknesse* of the *Soile*, *Seed*, or *Root*; And the *Injurie* of the *Weather*) commeth either of their *Over-growing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting* too deepe; Or by *Issuing* of the *Sap* too much into the *Leaves*. For all these there are *Remedies* mentioned before.

Experiments
in Confort,
touching
Compound
Fruits and
Flowers.

We see that in *Living Creatures*, that have *Male* and *Female*, there is *Copulation* of severall *Kindes*; and so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Ass*; And some other *Compounds*, which we call *Monsters*, though more rare: And it is held, that that *Proverbe*, *Africa semper aliquid Monstri parit*; commeth, for that the *Fountains* of *Waters* there, being rare, divers *Sorts* of *Beasts* come from severall *Parts* to drink; And so being refreshed, fall to couple, & many times with severall *Kinds*. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; which neverthelesse, if it bee possible, is more at command than that of *living Creatures*; For that their *Lust* requirerh a voluntary *Motion*: wherefore it were One of the most *Notable Experiments* touching *Plants*, to finde it out: For so you may have great *Variety* of *New Fruits*, and *Flowers* yet unknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the *Power* to make a *New Kinde*. For the *Cions* ever over-ruleth the *Stocke*.

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It hath been set downe by one of the *Ancients*, that if you take two *Twigs* of severall *Fruit Trees*, and flatch them on the *Sides*, and then binde them close together, and set them in the *ground*, they will come up in one *Stocke*; But yet they will put forth their severall *Fruits* without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Unity* of *Cominiance*, is easier to procure,

procure, than *Unity* of *Species*. It is reported also that *Vines* of *Red* and *White Grapes*, being set in the *Ground*, and the upper *Parts* being flatted, and bound close together, will put forth *Grapes* of the severall *Colours*, upon the same *Branch*; And *Grape-Stones* of severall *Colours* within the same *Grape*: But the more, after a year or two; The *Unity* (as it seemeth) growing more *Perfekt*. And this will likewise helpe, if from the first *Uniting*, they be often *Watred*; For all *Moisture* helpeth to *Union*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time.

They report, that divers *Seeds*, put into a *Clout*, and laid in *Earth* well dugged, will put up *Plants* *Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a *Narrow Mouth*, filled with *Earth*.

It is reported, that young *Trees* of severall *kindes*, set contiguous without any binding, and very often *Watred*, in a *Fruitfull Ground*, with the very *Luxury* of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest *Meanes*, that hath beene propounded; For that the *Binding* doth hinder the *Naturall Swelling* of the *Tree*; which, while it is in *Mortion*, doth better unite.

There are many *Ancient* and *Received Traditions* and *Observations*, touching the *Sympathy* and *Antipathy* of *Plants*; For that some will thrive best growing neare others; which they impute to *Sympathy*: And some worse; wch they impute to *Antipathy*. But these are *Idle* & *Ignorant Concoits*; And forsake the true *Indication* of the *Causes*; As the most *Part* of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any such *Secret Friendship*, or *Hatred*, as they imagine; And if we should be content to call it *Sympathy*, and *Antipathy*, it is utterly mistaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Wheresoever one *Plant* draweth such a particular *Juyce* out of the *Earth*; as it qualifieth the *Earth*; So as that *Juyce* which remaineth is fit for the other *Plant*, there the *Neighbourhood* doth good; Because the *Nourishments* are contrarie, or severall: But where two *Plants* draw (much) the same *Juyce*, there the *Neighbourhood* hurteth; For the one deceiveth the other.

First therefore all *Plants* that doe draw much *Nourishment* from the *Earth*, and so soake the *Earth*, and exhaust it; hurt all *Things* that grow by them; As *Great Trees*, (especially *Asbes*), and such *Trees*, as spread their *Roots*, neare the *Top* of the *Ground*. So the *Colewort* is not an *Enemy*, (though that were anciently received) to the *Vine* onely; But it is an *Enemy* to any other *Plant*; Because it draweth strongly the fattest *Juyce* of the *Earth*. And if it be true, that the *Vine*, when it creepeth neare the *Colewort*, will turne away; This may be, because there it findeth worse *Nourishment*; For though the *Root* be where it was, yet (I doubt) the *Plant* will befid as it nourisheth.

K 3

Where

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Experiments
in Confort
touching the
Sympathy and
Antipathy of
Plants.

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Where *Plants* are of severall Natures, and draw severall Juices out of the Earth, there (as hath been said) the One set by the other helpeth: As it is set down by divers of the Ancients, that *Rew* doth prosper much, and be commeth stronger, if it bee set by a *Figge-Tree*: which (wee conceive) is caused, Not by Reason of Friendship, but by Exraction of a Contrary Juice: The one Drawing Juice fit to result Sweet, the other bitter. So they have set downe likewise, that a *Rose* set by *Garlick* is sweeter: Which likewise may be, because the more Fetide Juice of the Earth goeth into the *Garlick*; And the more Odorate into the *Rose*.

This wee see manifestly, that there be certaine *Corne-Flowers*, which come seldome or never in other places, unlesse they be set; But onely amongst *Corne*: As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitory*. Neither can this be, by Reason of the Culture of the Ground, by Plowing, or Furrowing; As some Herbs, and Flowers, will grow but in *Ditches* new Cast; For if the Ground lie fallow, and unfowne, they will not come: So as it should seeme to be the *Corne*, that qualifieth the Earth, and prepareth it for their Growth:

This Observation, if it holdeth, (as it is very probable,) is of great use, for the Meliorating of Taste in Fruits, and Esculent Herbs; And of the Sem of Flowers. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more strong, and bitter, (as the Ancients have noted,) good store of *Rew* planted about the *Figge-Tree*, will make the *Figge* more sweet. Now the Tastes that doe most offend in Fruits, and Herbs, and Roots, are Bitter; Harsh; Sowre; And warishe, or Flasy. It were good therefore to make the Trials following.

Take *Wormewood*, or *Rew*, and set it neare *Lettuce*, or *Coleflory*, or *Artichoke*; And see whether the *Lettuce*, or the *Coleflorie*, &c. become not the sweeter.

Take a *Service-Tree*, or a *Cornelian-tree*, or an *Elder-Tree*, which we know have Fruits of harsh and binding Juice, and set them neare a *Vine*, or *Figge-Tree*, and see whether the *Grapes*, or *Figges*, will not be the sweeter.

Take *Cucumbers*, or *Pumpions*, and set them (here and there) amongst *Musk-Melons*, and see whether the *Melons* will not be more Winy, and better tasted. Set *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish* will not be made the more Biting.

Take *Sorrell*, and set it amongst *Rasps*, and see whether the *Rasps* will not be the sweeter.

Take *Common Briar*, and set it amongst *Violets*, or *Wall-Flowers*, and see whether it will not make the *Violets*, or *Wall-Flowers* sweeter, and lesse Earthy in their Smell. So set *Borage*, or *Cucumbers*, amongst *Rosemary*, or *Bayer*, and see whether the *Rosemary*, or *Bayer* will not be the more Odorate, or Aromaticall.

Contrariwise, you may take heed, how you set Herbs together, that draw much the like Juice. And therefore I thinke *Rosemary* will lesse in Sweetness, if it be set with *Lavender*, or *Dryas*, or the like. But yet, if you will correct the strength of an Herbe, you shall doe well to set other like Herbs by him, to take him downe. And if you should set *Ransy* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Wormewood*, it may be, the *Wormewood* would turne to be like *Rew*.

This *Articulate* is of large extent, And therefore would be severed, and refined by Tryall. Neither must you expect to have a *Grosse* Difference by this kinde of Culture, but only *Further Perfection*.

Triall would bee also made in Herbs Poysonous, and Purgative, whose ill Qualitie (perhaps) may be discharged, or attempted, by Setting stronger Poysons, or Purgatives, by them.

It is reported, that the *Shrub* called *Our Ladies Seale*; (which is a Kinde of *Briony*), and *Colewort*, set neare together, one or both will die. The Cause is, for that they be both great Depredatours of the Earth, and one of them starveth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One deceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw strong Juices.

Some of the Ancients, and likewise divers of the Moderne Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sunne*, *Moone*, and some Principall *Starres*; And certaine Herbs, and Plants. And so they have denominated some Herbs *Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some Flowers, that have Respect to the *Sunne*, in two Kindes; The one by Opening and Shuutting; And the other by Bowing and Inclining the Head. For *Mary-golds*, *Tullippas*, *Pimpernell*, and indeed most Flowers, doe open or spread their Leaves abroad, when the *Sunne* shineth serene and faire: And againe, (in some part,) close them, or gather them inward, either towards Night, or when the Skie is overcast. Of this there needeth no such Solemne Reason to be assigned; As to say, that they rejoyce at the presence of the *Sunne*; And mourne at the absence thereof. For it is Nothing else, but a little Loading of the Leaves, and Swelling them at the Bottome, with the Moisture of the Aire; whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Claver* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is nothing, but a full Expansion of the leaves. For the *Bowing* and *Inclining* the Head; it is found in the great Flower of the *Sunne*; in *Marigolds*; *Wart-wort*; *Mallow Flowers*; and others. The Cause is somewhat more Obscure than the former; But I take it to bee, no other, but that the Part against which the *Sunne* beateth, waxeth more faint and flaccide in the *Stalke*; And thereby lesse able to support the Flower.

What a little Moisture will doe in Vegetables, even though they be dead, and severed from the Earth, appeareth wel in the Experiment of *Inglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottome, and one smooth entire Straw at the Top. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* halfe the Breadth of a Finger in length. Then they make a little *Crosse* of a *Quill*, long-ways of that Part of the *Quill*, which hath the Pith; And *Crosse*-ways of that Peece of the *Quill* without Pith; The whole *Crosse* being the Breadth of a Finger high. Then they pricke the Bottome where the Pith is, and thereinto they put the *Oaten-beard*, leaving halfe of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if somewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to stick. Then likewise by way of Imposure, they make a Question; As, Who is the Fairest Woman in the Company? Or, Who hath a Glove, or Card? And cause Another to name divers Persons: And upon every Naming, they stick the *Crosse* in the Box, having first put it towards their mouth, as if they charmed it; And the *Crosse* sticketh not; But when they come to the Person that they would take; As they hold the *Crosse* to their Mouth, they touch the *Beard* with the Tip of their Tongue, and wet it; And so stick the *Crosse* in the Box; And then you shall see it turne finely and

and softly, three or foure Turnes, which is caused by the untwining of the *Beard* by the Moisture. You may see it more evidently, if you sticke the *Crosse* betweene your fingers, in stead of the *Box*; And therefore you may see, that this *Motion*, which is Effected by so little *Wet*, is stronger than the *Closing* or *Bending* of the *Head* of a *Marigold*.

It is reported by some, that the *Herbe* called *Rosa-Solis*, (whereof they make *Strong Waters*;) will at the Noone-day, when the *Sunne* shineth hot and bright, have a great *Dew* upon it. And therefore, that the right Name is *Ros Solis*: which they impute to a *Delight* and *Sympathy*, that it hath with the *Sunne*. Men favour Wonders. It were good first to be sure, that the *Dew* that is found upon it, be not the *Dew* of the Morning Preserved, when the *Dew* of other *Herbs* is breathed away, for it hath a smooth and thick *Leafe*, that doth not discharge the *Dew* so soone, as other *Herbs* that are more Spungy and Porous. And it may be *Purslane*, or some other *Herbe*, doth the like, and is not marked. But if it be so, that it hath more *Dew* at Noon, than in the Morning, then sure it seemeth to be an *Exudation* of the *Herbe* it selfe. As *Plummes* sweat when they are set into the *Oven*: for you will not (I hope) thinke, that it is like *Gedeons Fleece* of *Wooll*, that the *Dew* should fall upon that, and no where else.

It is certaine, that the *Honey-dews*, are found more upon *Oake-leaves*, than upon *Asb*, or *Beech*, or the like: But whether any *Cause* be, from the *Leafe* it selfe, to concoct the *Dew*, Or whether it be onely, that the *Leafe* is Close and Smooth, (And therefore drinketh not in the *Dew*, but preserveth it,) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but upon certaine *Herbs* or *Leaves* onely. *Flowers* that have deep *Sockets*, doe gather in the *Bottom*, a kinde of *Honey*: As *Honey-Suckles*; (both the *woodbine*, and the *Trifolium*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the *Dew*.

The Experience is, that the *Froth*, which they call *Woodfare*, (being like a kinde of *Spittle*;) is found but upon certaine *Herbs*, and those hot Ones; As *Lavender*, *Lavender-cotton*, *Sage*, *Hyssope*, &c. Of the *Cause* of this enquire further: For it seemeth a *Secret*. There falleth also *Mildew* upon *Corne*, and smothereth it; But it may be, that the same falleth also upon other *Herbs*, and is not observed.

It were good, Triall were made, whether the great Consent betweene *Plants* and *Water*, which is a principall Nourishment of them, will make an *Air* shorter Distance, and not at Touch onely. Therefore take a *Vessel*, and in the middle of it make a false *Bottom* of coarse *Canvasse*: Fill it with *Earth* upon the *Canvasse*, and let not the *Earth* be watered. Then sow some good *Seeds* in that *Earth*. But under the *Canvasse*, some halfe a foot in the *Bottom* of the *Vessel*, lay a great *Sponge*, thorowly wet in *water*; And let it live so some Ten *Dayes*: And see whether the *Seeds* will sprout, and the *Herbs* become more *Moist*, and the *Sponge* more drie. The Experiment formerly mentioned of the *Cucumber*, creeping to the *Pot* of *Water*, is true longer than this.

Experiments
in Confort,
touching the
Making Herbs
and Fruits
Medicinalle.

W. O. varumco...
The *Moisture* of the *Soyle*, *Colours*, or *Taste* of *Fruits*, by *Infusing*, *Mixing*, or *Laying* into the *Herbs*, or *Roots* of the *Tree*, *Herbs*, or *Flower*, any *Coloured*, *Scented*, or *Medicinal* Substances, are but *Fancies*. The *Cause* is, for that the *Seeds* have passed their *Period*, and nourish not. And all *Alteration* of *Qualities* in these *Qualities* must be by somewhat that is apt to go in to the *Seeds* of the *Plant*. And this is true, that where *Kine* feed upon

wilde

Wilde Garlicke, their *Milke* tasteth plainly of the *Garlicke*: And the *Flesh* of *Muttons* is better tasted where the *Sheepe* feed upon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the *Curing* of the *Scirrhus* of the *Liver*, by *Milke* of a *Cow*, that feedeth upon certaine *Herbs*; And *Honey* in *Spain* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Maiden* that was fed with *Napellus*, (which is counted the Strongest poyson of all *Vegetables*; which with use did not hurt the *Maid*, but poisoned some that had *Carnall* Company with her. So it is observed by some, that there is a virtuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the *Virtuous* is taken from the *Beast*, that feedeth upon the *Mountaines*, where there are *Theriackall Herbs*; And that without Vertue, from those that feed in the *Valleys*, where no such *Herbs* are. Thus farre I am of Opinion; That as Steeped *Wines* and *Beeres*, are very *Medicinall*; And likewise *Bread* tempered with divers *Powders*; So of *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Egges*;) that they may be made of great use for *Medicine*, and *Diet*, if the *Beast*, *Fowle*, or *Fish*, be fed with a speciall kinde of food, fit for the *Disease*. It were a dangerous Thing also for secret *Empoysonments*. But whether it may be applied unto *Plants*, and *Herbs*, I doubt more; Because the *Nourishment* of them is a more common *Juyce*; which is hardly capable of any speciall *Qualitie*, untill the *Plant* doe assimilate it.

But least our *Incredulitie* may prejudice any profitable Operations in this kinde, (especially since Many of the *Ancients* have set them downe,) Wee thinke good briefly to propound the foure *Meanes*, which they have devised of Making *Plants* *Medicinalle*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it up againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the *Earth*; And so the *Nourishment* is the more Common, and lesse Qualified: And besides, it is a long time in *Going* up, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any Vertue be received from the *Medicine*, it hath the lesse way, and the lesse time to goe up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, wherein the *Medicine* is *Infused*: Which I have little Opinion of, because the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which have the *Propriety*: But it will be farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant* oft, with an *Infusion* of the *Medicine*. This, in one respect may have more force than the rest; Because the *Medication* is oft renewed; Whereas the rest are applied but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborn to receive those fine *Impressions*; And besides, (as I said before,) they have a great *Hill* to goe up. I judge therefore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in severall places, one above the other;

And the *Filling* of the *Holes* with *Dung* mingled with the *Medicine*.

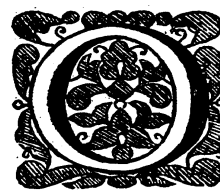
And the *Watering* of those *Lumps* of *Dung*, with *Squirts* of an *Infusion* of the *Medicine* in *Dunged Water*, once in three, or foure *Dayes*.

NATU-



NATVRALL HISTORIE.

VI. Century.



OUR *Experiments* wee take care to bee, (as wee have often said,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vse*, or of *Discovery*: For wee hate *Impostures*; And despise *Curiosities*. Yet because wee must apply our Selves somewhat to Others, we will set down some *Curiosities* touching *Plants*.

It is a *Curiositie*, to have severall *Fruits* upon one *Tree*; And the more, when some of them come *Earely*, and some come *Late*; So that you may have, upon the same *Tree*, Ripe *Fruits* all Sommer. This is easily done, by Grafting of severall *Cions*, upon severall *Boughes*, of a *Stock*, in a good Ground, plentifully fed. So you may have all *Kindes* of *Cherries*, and all *kindes* of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diversitie* of *Fruits* must be such, as will graft upon the same *Stock*. And therefore I doubt, whether you can have *Apples*, or *Pearres*, or *Oranges*, upon the same *Stoque*, upon which you graft *Plums*.

It is a *Curiosity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long as a Cane; Or as round as a *Sphære*; Or formed like a *Crosse*. You may have also *Apples*, in the forme of *Pearres*, or *Lemons*. You may have also *Fruit* in more Accurate *Figures*; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds. Wherein you must understand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greatest: For else you will choake the Spreading of the *Fruit*; Which otherwise would spread it selfe, and fill the Concave, and so be turned into the *Shape* desired; As it is in Mould workes of Liquid things. Some doubt may be conceived,

Experiments
in Confort
touching
Curiosities
about *Fruits*
and *Plants*.

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ceived, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit*, that groweth Covered. *Quare* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curiositie*, to have *Inscriptions*, or *Engravings*, in *Fruit*, or *Trees*. This is easily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, so the Letters will grow more large, and Graphicall.

*Tenerisque meos incidere Amores
A boribus crescent illa, crescentis Amores.*

504 You may have *Trees* apparelled with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth* bolpen with *Mucke*, and *Sowing Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and such like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Poss*; Though (perhaps) with some Feeding from the *Trees*. It would bee tried also with *Shoots* of *Vines*, and *Roots* of *Red-Rises*; For it may be, they being of a more *Ligneous* Nature, will incorporate with the *Tree* it selfe.

505 It is an ordinary *Curiositie*, to *Forme Trees* and *Shrubs*, (as *Rosemary*, *Juniper*, and the like,) into *Sundry Shapes*; which is done by *Moulding* them within, and *Cutting* them without. But they are but lame Things, being too small to keepe *Figure*: Great *Castles* made of *Trees* upon *Frames* of *Timber*, with *Turrets*, and *Arches*, were anciently matters of *Magnificence*.

506 Amongst *Curiosities*, I shall place *Colouration*, though it be somewhat better: For *Beauty* in *Flowers* is their *Preheminence*. It is observed by some, that *Gilly-Flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither *Watered*, nor *New Moulded*, nor *Transplanted*, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White* Colour commeth of *Scarcity* of *Nourishment*; Except in *Flowers* that are onely *White*, and admit no other Colours.

507 It is good therefore, to see what *Natures* doe accompany what Colours; For by that you shall have *Light*, how to induce Colours, by Producing those *Natures* *Whites* are more *Inodorate*, (for the most part,) than *Flowers* of the same kinde *Coloured*; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. We finde also, that *Blossomes* of *Trees*, that are *White*, are commonly *Inodorate*, As *Cherries*, *Pears*, *Plums*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are *Blushy*, and *Smell sweet*. The Cause is, For that the Substance that Maketh the Flower, is of the thinnest and finest of the Plant; Which also maketh Flowers to be of so dainty Colours. And if it be too *Sparing*, and *Thinne*, it attaineth no *Strength* of *Odour*; Except it be in such Plants, as are very *Succulent*. Whereby they need rather to be scanted in their *Nourishment*, than replenished, to have them sweet. As we see in *White Sayrion*, which is of a dainty *Smell*; And in *Beane-Flowers*, &c. And againe, if the Plant be of *Nature*, to put forth *White Flowers* onely, and those not *thinne*, or *drie*, they are commonly of *ranche* and *fulsome Smell*; As *May-Flowers*, and *White Lilies*.

508 Contrariwise, in *Berries*, the *White* is commonly more *Delicate*, and *Sweet* in *Taste*, than the *Coloured*; As we see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The Cause is, for that the

the *Coloured* are more *juiced*, and *courser jnyced*; And therefore not so well and equally *Concocted*; But the *White* are better proportioned, to the *Disgestion* of the Plant.

But in *Fruits*, the *White* commonly is meaner; As in *Pearre-Plums*, *Damasins*, &c. And the *Choiceest Plummes* are *Blacke*; The *Mulberrie*, (which though they call it a *Berry*, is a *Fruit*), is better the *Blacke*, than the *White*. The *Hardest White-Plumme*, is a *bare Plumme*; And the *Verdoccio* and *White Drie-Plumme*, are no very good *Plummes*. The Cause is, for that they are all *Overwatry*: Whereas an higher *Concoction* is required for *Sweetnesse*, or *Pleasure* of *Taste*; And therefore all your dainty *Plummes*, are a little *drie*, and come from the *Stone*; As the *Muckle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to be *Blacke*, are of the *Nature* of *Berries*, *sweetest* such as are *Paler*; As the *Cœur-Cherry*, which inclineth more to *White*, is *sweeter* than the *Red*; But the *Egriot* is more *lowre*.

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Clove-Gilly-Flower*, which is the most *Common*;) And sow it; And there will come up *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with *Nourishment* in the *Earth*; So that the *Gardiners* finde, that they may have two or three *Roots* amongst an hundred, that are rare, and of great *Price*; As *Purple*, *Carnation* of severall *Stripes*; The Cause is, (no doubt,) that in *Earth*, though it be contiguous, and in one *Bed*, there are very severall *Juyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which do come up *Purple*, doe alwayes come up *Single*; The *Juyce*, as it seemeth, nor being able to suffice a *Succulent Colour*, and a *Double Leaf*. This Experiment of severall Colours, coming up from one *Seed*, would bee tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppey*, and *Hollyske*.

Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*, *Mulberries* likewise; and *Grapes*, though most toward the *Skinne*. There is a *Peach* also, that hath a *Circle* of *Red* towards the *Stone*: And the *Egriot-Cherry* is somewhat *Red* within; But no *Pears*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they have (many times) *Red* sides, are coloured *Red* within. The Cause may be enquired.

The generall Colour of Plants is *Greene*; which is a Colour that no Flower is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murry*, or *Reddish*; And they bee commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Hasse*. *Leaves* rot into a *Yellow*; And some *Hollies* have part of their *Leaves* *Yellow*, that are, (to all seeming,) as *Fresh* and *Shining*, as the *Greene*. I suppose also, that *Yellow* is a lesse *Succulent Colour*, than *Greene*; And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand ever towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some Plants *Bloud-Red*, *Stalke* and *Leaf*, and all; As *Amarambus*. Some *Herbes* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some have *White Leaves*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure* and a *Faire Purple*, are never found in *Leaves*. This sheweth that *Flowers* are made of a refined *Juyce*, of the *Earth*; And so are *Fruits*: But *Leaves* of a more *Course*, and *Common*.

It is a *Curiositie* also to make *Flowers Double*; Which is effected by *Often Removing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by

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by neglecting, and not Removing, prove *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips Of Flowers*; And as soone as they come up, to remove them into new Ground, that is good. Enquire also, whether *Begetting Of Flowers*, as *Stock, Gilly-Flowers, Roses, Musk-Roses, &c.* doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossoms*. But that Tree beareth no *Fruit*; And, it may be, that the same Meanes, which applyed to the Tree, doth extremely accelerate the Sap to rise, and begeth forth, Would make the Tree spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees, Peach-Trees, and Almond-Trees*, that have *Blossomes Blush-Coloured*.

The Making Of *Fruits* without *Core* or *Stone*, is likewise a *Curiositie*; And somewhat better: Because whatsoever maketh them so, is like to make them more *Tender and Delicate*. If a *Cions* or *Shoot*, fit to be set in the Ground, have the *Pith* finely taken forth, (and not altogether, but some of it left, the better to save the life, it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to be, of dividing a *Quick-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it up againe.

It is reported also, that a *Garon* grafted upon a *Quince*, will have small or no *Seeds*; And it is very probable, that any *Soure-Fruit* grafted upon a *Stocke*, that beareth a *Sweeten-Fruit* may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernels*, or *Seeds*.

It is reported, that not onely the Taking out of the *Pith*, but the Stopping of the *Juyce* of the *Pith*, from Rising in the Middest, and Turning it to rise on the Outside, will make the *Fruit* without *Core*, or *Stone*; As if you should bore a *Tree* cleane thorow, and put a wedge in. It is true, there is some Affinity betweene the *Pith* and the *Kernell*, because they are both of a harsh Substance, and both placed in the Middest.

It is reported that *Trees* watered perpetually with *Warm Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the Rule is generall, that whatsoever will make a *Wilde-Tree*, a *Garden-Tree*, will make a *Garden-Tree* to have little *Core*, or *Stone*.

Experiments
in Confect,
touching the
Degenerating
of Plants,
And of the
Transmutation
of them, one
into another.

The Rule is certaine, that *Plants* for want of Culture, degenerate to be baser in the same Kinde; And sometimes so farre, as to change into another Kinde. 1. The *Standing long*, and not being *Removed*, maketh them degenerate. 2. *Drought*, unless the Earth of it selfe be moist, doth the like. 3. So doth *Removing* into worse Earth, or *Forbearing* to compost the Earth; As wee see that *Water-Mint* turneth into *Field-Mint*; And the *Colewort* into *Rue*; by Neglect, &c.

Whatsoever *Fruit* useth to be set upon a *Root*, or a *Slip*, if it be sowne, will degenerate. *Grapes sowne*, *Figs*, *Almonds*, *Pomgranate Kernels sowne*, make the *Fruits degenerate*, and become *Wilde*. And againe, Most of those *Fruits* that useth to be grafted, if they be set of *Kernels*, or *Stones*, degenerate. It is true, that *Peaches*, (as hath beene touched before,) doe better upon *Stones* set, than upon *Grafting*: And the Rule of Exception should seeme to be this; That whatsoever *Plant* requireth much Moisture, prospereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the *Stocke*, though it giveth a finer Nourishment, yet it giveth a scantier, than the Earth at large.

Seeds, if they be very Old, and yet have strength enough to bring forth a *Plant*, into the same *degenerate*. And therefore skilfull Gardiners make triall of the same, before they buy them, whether they be good or no, by Putting them

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them into *Water* gently Boyled; And if they be good, they will sprout within halfe an *Hour*.

It is strange which is reported, that *Basil* too much exposed to the *Sunne*, doth turne into *Wilde Time*: Although those two *Herbs* seeme to have small Affinity; but *Basil* is almost the onely *Hot Herbe*, that hath *Fat* and *Succulent Leaves*; Which Oyliness, if it be drawne forth by the *Sunne*, it is like it will make a very great Change.

There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *Wilde Vines*: Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it selfe.

It is not impossible, and I have heard it verified, that upon Cutting downe of an Old *Timber-Tree*, the *Stub* hath put out sometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it be true, the Cause may be, for that the old *Stub* is too scant of *Juyce*, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a smaller kinde, that needeth lesse Nourishment.

There is an Opinion in the Countrey, that if the same Ground be oft sowne, with the *Graine* that grew upon it, it will, in the end, grow to be of a baser kinde.

It is certaine, that in very *Sterile Yeares*, *Corne* sowne will grow to an Other Kinde.

*Grandia sæpe quibus mandavimus Hordea Sulcis,
Infelix Lolium, & steriles dominantur Avena.*

And generally it is a Rule, that *Plants* that are brought forth by Culture, as *Corne*, will sooner change into other *Species*, than those that come of themselves: For that Culture giveth but an *Adventitious Nature*, which is more easily put off.

This worke of the Transmutation of *Plants*, one into another, is inter *Magnalia Naturæ*: For the Transmutation of *Species* is, in the vulgar philosophy, pronounced Impossible: And certainly it is a thing of difficultie, and requireth deep Search into Nature: But seeing there appeare some manifest Instances of it, the Opinion of Impossibilitie is to be rejected; And the Meanes thereof to be found out. Wee see, that in *Living Creatures*, that come of *Putrefaction*, there is much Transmutation, of one into another; As *Caterpillers* turne into *Flies*, &c. And it should seeme probable, that whatsoever *Creature*, having life, is generated without *Seed*, that *Creature* will change out of one *Species* into another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as we may well conclude, that seeing the Earth, of it selfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well have a Transmigration of *Species*. Wherefore wanting Instances, which doe occurre, wee shall give Directions of the most likely Tryalls: And generally, we would not have those,

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that read this Worke of *Sylva Sylvarum*, account it strange, or thinke that it is an Over-Haste, that we have set downe Particulars untried; For contrariwise, in our owne Estimation, wee account such Particulars, more worthy, than those that are already tried and knowne. For these Later must be taken as you finde them; But the Other doe levell Point blank at the *Inventing of Causes, and Axiomes*.

526 First, therefore you must make account, that if you will have one *Plant* change into another, you must have the *Nourishment* over-rule the *Seed*: And therefore you are to practise it by *Nourishments* as contrary, as may bee, to the *Nature* of the *Herbe*; Sonvertheless as the *Herb* may grow, And likewise with *Seeds* that are of the Weakest Sort, and have least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them upon *Tops of Hills*, and *Champaignes*; And such *Plants* as require much Moisture, upon *Sandie* and very drie *Grounds*. As for Example, *Marsh-Mallows*, and *Sedge*, upon *Hills*; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, upon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, & *Brakes*, upon a *Wet* or *Marsh Ground*. This I conceive also, that all *Esculent* and *Garden-Herbs*, set upon the *Tops of Hills*, will prove more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wilde Herbs* you may make *Salter-Herbs*. This is the first Rule for *Transmutation of Plants*.

527 The second Rule shall bee to bury some few *Seeds*, of the *Herb* you would change, amongst other *Seeds*; And then you shall see, whether the *Juyce* of those other *Seeds*, doe not so qualifie the *Earth*, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsly-Seed*; Or *Basil-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forraine *Seed*.

528 The third Rule shall be, the *Making* of some *Medley* or *Mixture* of *Earth*, with some other *Plants* *Bruised*, or *Shaven*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort-Leaves* stamped, and set in it *Arishokes*, or *Parsnips*; So take *Earth* made with *Marjoram*, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the *Proesse* of *Nature* still will be, (as I conceive,) not that the *Herbe* you worke upon, should draw the *Juyce* of the *Forraine Herbe*; (For that Opinion we have formerly rejected;) But that there will bee a New *Confection* of *Mould*, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*.

529 The fourth Rule shall be, to marke what *Herbs*, some *Earths* doe put forth of themselves; And to take that *Earth*, and to *Pos* it, or to *Vessell* it, And in that to set the *Seed* you would change: As for Example, take from under *Walls*, or the like, where *Newles* put forth in abundance, the *Earth* which you shall there finde, without any *Spring*, or *Root* of the *Nestles*; And *Pos* that *Earth*, and set in it *Stock-gilly-flowers*, or *Wall-Flowers*, &c. Or sow in the *Seed* of them; And see what the Event will bee: Or take *Earth*, that you have prepared to put forth *Atisbromes*, of it selfe, (whereof you shall see some *Instances* following;) And sow in it *Purslane-Seed*, or *Lettuce-Seed*; For in these *Experiments*, it is likely enough, that the *Earth* being accustomed to send forth one *Kinde* of *Nourishment*, will alter the new *Seed*.

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The fifth Rule shall be, to make the *Herbe* grow *Contrary* to his *Nature*; As to make *Ground-Herbs* rise in *Heighth*: As for example; Carry *Campion*, or *Wilde-Thyme*, or the *Greene-Strawberry*, upon *Sticks*, as you doe *Hops* upon *Poles*; And see what the Event will be.

The sixth Rule shall be, to make *Plants* grow out of the *Sunne*, or open *Aire*; For that is a great *Mutation* in *Nature*; And may induce a *Change* in the *Seed*: As barrell up *Earth*, and sow some *Seed* in it, and put in the *Bottom* of a *Pond*; Or put it in some great hollow *Tree*; Trie also the *Sowing of Seeds*, in the *Bottomes* of *Caves*; And *Pots* with *Seeds* sowne, hanging up in *Wells*, some distance from the *Water*, and see what the Event will be.

It is certaine, that *Timber-Trees* in *Coppice-Woods*, grow more upright, and more free from *Under-Boughs*, than those that stand in the *Field*: The *Cause* whereof is, for that *Plants* have a *Naturall Motion*, to get to the *Sunne*, And besides, they are not glutted with too much *Nourishment*; For that the *Coppice* shareth with them; And *Repletion* ever hindereth *Stature*; Lastly, they are kept warme; And that ever in *Plants* helpeth *Mounting*.

Trees, that are, of themselves, full of *Heat*, (which *Heat* appeareth in their *Inflammable Gums*), as *Firrs*, and *Pines*, mount of themselves in *Heighth* without *Side-Boughs*, till they come towards the *Top*. The *Cause* is, partly *Heat*; And partly *Tenuity* of *Juyce*; Both which send the *Sap* upwards. As for *Iuniper*, it is but a *Shrub*, and groweth not bigge enough in *Body*, to maintaine a tall *Tree*.

It is reported, that a Good Strong *Canvas*, spread over a *Tree* grafted low, soone after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all Things that grow, will grow as they finde *Roome*.

Trees are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*), some of the *Slips* will take; And those that take, (as is reported,) will be *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth *Nourishment* more weakly, than either a *Root*, or *Kernell*.

All *Plants* that put forth their *Sap* hastily, have their *Bodies* not proportionable to their *Length*; And therefore they are *Winders*, and *Creepers*; As *Ivy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow *Putting* forth, and lesse *Vigour* of *Mounting*.

The *Scripture* saith, that *Salomon* wrote a *Naturall History*: from the *Cedar of Libanus*, to the *Mosse* growing upon the *Wall*: For so the best *Translations* have it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Mosse groweth chiefly upon *Ridges* of *Houses*, tiled or thatched; And upon the *Crests* of *Walls*. And that *Mosse* is of a light some, and pleasant *Green*. The *Growing* upon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of *Moisture* and *water*, so on the other side the *Water* must but *Slide*, and not stand or *Poole*. And the *Growing* upon *Tiles*, or *Walls*, &c. is caused, for that those dried *Earths*, having not *Moisture* sufficient to put forth a *Plant*, doe practise *Germination* by *Putting* forth *Mosse*; Though when by *Age*, or otherwise, they grow to relent and resolve, they

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Experiments in Confort touching the *Procreancy*, and *Lowness*, and *Artificiall* dwarfing of *Trees*.

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Experiments in Confort, touching the *Rudiments* of *Plants*, and of the *Excrecences* of *Plants*, or *Super-Plants*.

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sometimes put forth *Planis*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little *Stalkes*, besides the low *Thrumme*.

Mosse groweth upon *Alleyes*, especially such as lie Cold, and upon the North; As in divers *Tamasses*: And againe, if they be much trodden, Or if they were at the first, gravelled; For wheresoever *Planis* are kept downe, the *Earth* putteth forth *Mosse*.

Old Ground, that hath been long unbroken up, gathereth *Mosse*: And therefore *Husbandmen* use to cure their *Pasture Grounds*, when they grow to *Mosse*, by Tilling them for a year, or two: Which also dependeth upon the same Cause; For that the more Sparing and Starving Juyce of the *Earth*, insufficient for *Planis*, doth breed *Mosse*.

Old Trees are more *Mossie*, (farre) than *Young*; For that the Sap is not so franke as to rise all to the Boughes, but tyreth by the Way, and putteth out *Mosse*.

Fountaines have *Mosse* growing upon the *Ground* about them;

Muscoli Eomes:
The Cause is, for that the *Fountaines* draine the *Water* from the *Ground* Adjacent, and leave but sufficient *Moisture* to breed *Mosse*: And besides, the Coldnesse of the *Water* conduceth to the same.

The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Juyce of the *Tree*, that is Excerned, and doth not Assimilate. And upon great *Trees* the *Mosse* gathereth a Figure, like a *Leafe*.

The *Moister Sort* of *Trees*, yeeld little *Mosse*; As we see in *Asps*, *Poplars*, *Willows*, *Berbers*, &c. Which is partly caused for the Reason that hath been given, of the francke Putting up of the Sap into the Boughes; And partly, for that the *Barks* of those *Trees*, are more Close, and Smooth, than those of *Oakes*, and *Ashes*. Whereby the *Mosse* can the hardlier issue out.

In *Clay Grounds*, all *Fruit-Trees* grow full of *Mosse*, both upon *Body* and *Boughes*; Which is caused, partly by the Coldnesse of the *Ground*, whereby the *Plants* nourish lesse; And partly by the Toughnesse of the *Earth*, whereby the Sap is shut in, and cannot get up, to spread so franckly, as it should doe.

We have said heretofore, that if *Trees* be *Hide-bound*, they wax lesse Fruitfull, and gather *Mosse*: And that they are holpen by *Hacking*, &c. And therefore by the Reason of Contraries, if *Trees* bee bound in with *Gords*, or some Outward *Bands*, they will put forth more *Mosse*: Which (I thinke) happeneth to *Trees* that stand Bleake, and upon the Cold Winds. It would also be tried, whether, if you cover a *Tree*, somewhat thick upon the top, after his *Powling*, it will not gather more *Mosse*. I thinke also, the *Warring* of *Trees* with Cold *Powder*, will make them grow full of *Mosse*.

There is a *Mossie Perfumery* have, which commeth out of *Apple-Trees*, that hath an Excellent Scent. Where particularly for the Manner of the Growth, and the Nature of it. And for this Experiment sake, being a Thing of Price, I have set down the last Experiments, how to multiply, and call on *Mosses*.

Next unto *Moss*, I will speake of *Mushromes*; Which are taken for an *Imperfect Plant*. The *Mushromes* have two strange Properties; The One, that they yeeld so Delicious a Meat; The other, that they come up so quickly; As in a Night. And yet they are so short-lived. And therefore such is are Upstarts in State, they call

call, in reproach, *Mushromes*. It muſt needs bee therefore, that they be made of much *Moysture*; And that *Moisture* Fat, Grosse, and yet somewhat Concocted. And (indeed) wee finde, that *Mushromes* cause the Accident, which wee call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfets* of them may Suffocate, and Emplayson. And this sheweth, that they are Windy; And that Windinesse is Grosse, and Swelling; Not Sharp, or Gripping. And upon the same reason *Mushromes* are a venereous Meat.

It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moistest of *Trees*), cut small, and cast into *Furrowes* well dunged, will cause the *Ground* to put forth *Mushromes*, at all *Seasons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leaven* of *Bread*, resolved in *Water*.

It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, be set on *Fire*, in the *Showry Season*, it will put forth great *Store* of *Mushromes*.

It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeces*, mixed with *Dung*, and watered, putteth up *Mushromes*. And we know that *Harts-Horne* is of a Fat and Clammie Substance: And it may bee *Oxe-Horne* would doe the like.

It hath beene reported, though it be scarce credible, that *Ivy* hath growne out of a *Stags-Horne*; which they suppose did rather come from a Confrication of the *Horne* upon the *Ivy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Precedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may bee *Triall* made of some *Seeds*, as that *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

There is also another *Imperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones *Hat*; Which they call a *Toads-Stoole*: But it is not *Esculent*; And it groweth (commonly) by a dead *Stub* of a *Tree*; And likewise about the *Roots* of *Rotten-Trees*: And therefore seemeth to take his Juyce from *Wood* *Putrified*. Which sheweth, by the way, that *Wood* *Putrified* yeeldeth a franke *Moisture*.

There is a *Cake* that groweth upon the *Side* of a *Dead Tree*, that hath gotten no Name, but it is large, and of a *Chestnut Colour*, and hard, and pithy; Whereby it should seeme, that even *Dead Trees* forget not their Putting forth; No more than the *Carcaffes* of *Mans Bodies* that put forth *Haire*, and *Nails*, for a Time.

There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* upon the Breaking; And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corrosive*, and *Fresting Nature*.

There is an *Herb* called *Jewes-Eare*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange Propertie; For in *Warne Water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is used for *Squinnancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to have a *Mollifying*, and *Lenifying Vertue*.

There

555 There is a Kinde of *Spongie Excrecence*, which groweth chiefly upon the *Roots* of the *Laser-Tree*, And sometimes upon *Cedar*, and other *Trees*. It is very *White*, and *Light*, and *Friable*: Which we call *Agarick*. It is famous in *Physick* for the *Purging of Tough flegme*. And it is also an excellent *Opener* for the *Liver*; But *Offensive* to the *Stomacke*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

556 We finde no *Super-Plant*, that is a *Formed Plant*, but *Mistletoe*. They have an idle *Tradition*, that there is a *Bird*, called a *Mistle-Bird*, that feedeth upon a *Seed*, which many times shee cannot digest, and so expelleth it whole with her *Excrement*: which falling upon a *Bow* of a *Tree*, that hath some *Rift*, putteth forth the *Mistletoe*. But this is a *Fable*; For it is not probable, that *Birds* should feed upon that they cannot digest. But allow that, yet it cannot be for other *Reasons*: For First, it is found but upon certain *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed upon them. It may be, that *Bird* feedeth upon the *Mistletoe-Berries*, and so is often found there; Which may have given occasion to the *Tale*. But that which maketh an *End* of the *Question*, is, that *Mistletoe* hath been found to put forth under the *Boughes*, and not (onely) above the *Boughes*: So it cannot be any Thing that falleth upon the *Bough*. *Mistletoe* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, sometimes upon *Hawes*; And rarely upon *Oakes*; The *Mistletoe* whereof is counted very *Medicinnall*. It is ever *greene*, *Winter* and *Summer*; And beareth a *White Glistering Berry*: And it is a *Plant*, utterly differing from the *Plant*, upon which it groweth. Two things therefore may be certainly set downe: First, that *Super-feration* must be by *Abundance of Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth excrete, and cannot assimilate; For else it would goe into a *Bough*. And besides, it seemeth to be more *Fat* and *Unctuous*, than the *Ordinary Sap* of the *Tree*; Both by the *Berry*, which is *Clammie*; And by that it continueth *greene*, *Winter* and *Summer*, which the *Tree* doth not.

557 This *Experiment* of *Mistletoe* may give *Light* to other *Practices*. Therefore *Triall* would be made, by *Ripping* of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Warring* of the *Wound* every *Day*, with *Warne-Water Dugged*, to see if it would bring forth *Mistletoe*, or any such like Thing. But it were yet more likely to trie it, with some other *Warring* or *Anointing*, that were not so *Naturall* to the *Tree*, as *Water* is; As *Oyle*, or *Baume* of *Drinke*, &c. So they be such Things as kill bee the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they bee forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and cover it, some thickness, with *Clay*, on the *Top*; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* also, the *Tree* would bee clofed with somewhat, that is not so *Naturall* to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Clay*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Becke* hath beene knowne to grow out of a *Pollard*.

559 A Man may count the *Prickles* of *Trees* to be a kinde of *Excrecence*; For they will never be *Boughes*, nor beare *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, blacke and white; *Briers*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Barkery*: These have it in the *Bough*; The *Plants* that have *Prickles* in the *Barke*, are, *Holly*; *Juniper*; *Whin-bush*; *Thistle*; *Nettles* also have a small *Venous* *Prickle*; As hath *Borage*, but harmelesse. The Cause must be *Hasty Putting forth*; *Want of Moisture*; And the *Closenesse* of the *Barke*; For the

the *Haste* of the *Spirit* to put forth, and the *Want* of *Nourishment* to put forth a *Bough*, and the *Closenesse* of the *Barke*, cause *Prickles* in *Boughes*; And therefore they are ever like a *Pyramis*, for that the *Moisture* spendeth after a little *Putting forth*. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth, and therefore the *Leaves* otherwise are *Rough*, as *Borage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but never *Plaine*, but as it were with *Folds*, for the same Cause.

There be also *Plants*, that though they have no *Prickles*, yet they have a kinde of *Downey* or *Velvet Rine*, upon their *Leaves*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colis-Foot*; which *Downe* or *Nap* commeth of a *Subrill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, have been applied, (with successe,) to the *Wrests* of those that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colis-Foot* hath a *Sanative vertue*, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*.

Another Kinde of *Excrecence* is an *Exudation* of *Plants*, joyned with *Putrefaction*; As wee see in *Oake-Apples*, which are found chiefly upon the *Leaves* of *Oakes*; And the like upon *Willowes*: And *Countrie People* have a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a *Signe* of a *Pestilent Teare*; Which is a likely Thing, because they grow of *Corruption*.

There is also upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of divers Colours; Which if you cut, you shall ever finde full of little white *Wormes*.

IT is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth *Sundry Kinds* of *Herbs*: But some *Time* is required, for the *Germination*; For if it be taken, but from a *Faithome* deep, it will put forth the *First Teare*; If much deeper, not till after a *Teare*, or *Two*.

The *Nature* of the *Plants* growing out of *Earth* so taken up, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* bee *Soft*, and *Fine*, it putteth forth *Soft Herbs*; As *Grasse*, *Plantaine*, and the like; If the *Earth* bee *Harder* and *Courser*, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c.

It is *Common Experience*, that where *Alleyes* are close *Gravelled*, the *Earth* putteth forth, the first yeare, *Knor-Grasse*, and after *Spire-Grasse*. The Cause is, for that the *Hard Gravel*, or *Pebble* at the first *Laying*, will not suffer the *Grasse* to come forth upright, but turneth it so finde his way where it can; But after that the *Earth* is somewhat loosened at the *Top*, the *Ordinary Grasse* commeth up.

It is reported, that *Earth*, being taken out of *Shady* and *Warry Woods*, some depth, and *Potted*, will put forth *Herbs* of a *Fat* and *Juicie Substance*; As *Penny-wort*, *Purslane*, *Houfleeke*, *Penny-royall*, &c.

The *Water* also doth send forth *Plants*, that have no *Roots* fixed in the *Bottom*; But they are lesse *Perfect Plants*, being almost but *Leaves*, and those *Small ones*: Such is that we call *Duck-weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher *Greene*, and putteth forth a little *String* into the *Water*, farre from the *Bottom*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so have a Number of other *Herbs* that grow in *Ponds*.

It

Experiments
in Consort,
touching the
Producing of
Perfect Plants
without Seed.

563

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568

It is reported by some of the *Ancients*, and some *Moderne Testimonie* likewise, that there be some *Planis*, that grow upon the Top of the *Sea*; Being supposed to grow of some Concretion of *Slime* from the *Water*, where the *Sunne* beareth hot, and where the *Sea* stirreth little. As for *Alga Marina*, (*Sea-weed*) and *Erugium* (*Sea-Thistle*), both have *Roots*; but the *Sea-weed* under the *Water*, the *Sea-Thistle* but upon the *Shore*.

569

The *Ancients* have noted, that there are some *Herbs*, that grow out of *Snow*, laid up close together, and *Purified*; And that they are all *Bitter*; And they name one especially, *Flomus*, which we call *Moth-Mullein*. It is certain, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewise put forth *Planis*.

570

The *Ancients* have affirmed, that there are some *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* have beene found in the Middle of a *Free-Stone*. We see also, that *Flints*, lying above *Ground*, gather *Moss*; And *Wall-Flowers*, and some other *Flowers*, grow upon *Walls*; But whether upon the *Maine Bricke*, or *Stone*, or whether out of the *Lime*, or *Chinks*, is not well observed; For *Elders* and *Asbes* have beene scene to grow out of *Speeles*: But they manifestly grow out of *Clefts*; In so much as when they grow bigge, they will dis-joyne the *Stone*. And besides, it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rock-Herbs*; But I suppose those are, where there is some *Mould* or *Earth*. It hath likewise been found, that great *Trees* growing upon *Quarries*, have put downe their *Root* into the *Stone*.

571

In some *Mines* in *Germany*, as is reported, there grow in the *Bottom* *Vegetables*; And the *Worke-Folks* use to say, they have *Magickall Verue*; And will not suffer men to gather them.

572

The *Sea-Sands* seldome beare *Planis*. Whereof the *Cause* is yeilded, by some of the *Ancients*, for that the *Sunne* exhalet the *Moisture*, before it can incorporate with the *Earth*, and yeeld a *Nourishment* for the *Plant*. And it is affirmed also, that *Sand* hath (alwayes) his *Root* in *Clay*; And that there be no *Veines* of *Sand*, any great depth within the *Earth*.

573

It is certaine, that some *Planis* put forth for a time, of their owne *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment 29*.

Experiments
in Consort,
touching
Fertile
Plants.

574

It is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* of *Ships*, cast upon some *Grounds* in *Italy*, did put forth *Fertile Herbs*, to us in *Europe* not knowne; And, that which is more, that of their *Roots*, *Barks*, and *Seeds*, confused together, and mingled with other *Earth*, and well *Watered* with *Warme Water*, there came forth *Herbs*, much like the *Other*.

575

Planis brought out of *Hot Countries*, will endeavour to put forth, at the same *Time*, that they usually doe in their owne *Climate*; And therefore to preserve them, there is no more required, than to keep them from the Injury of *Putting back* by *Cold*. It is reported also, that *Graine* out of the *Hotter Countries* translated into the *Colder*, will be more forward, than the *Ordinary Graine* of the *Cold Country*. It is likely, that this will prove better in *Graines* than in *Trees*; For that *Graines* are but *Annually*; And so the *Verue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, which it is *Removed*.

576

Many *Planis*, which grow in the *Hotter Countries*, being set in the *Colder*,

der, will neverthelesse, even in those *Cold Countries*, being sowne of *Seeds* late in the *Spring*, come up and abide most part of the *Summer*; As wee finde it in *Orange*, and *Limon-Seeds*, &c. The *Seeds* whereof sowne in the End of *April*, will bring forth excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be sowne, would doe the like.

There be some *Flowers*, *Blossomes*, *Graines*, and *Fruits*, which come more *Early*; And others which come more *Late* in the *Yeare*. The *Flowers* that come early, with us, are; *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffodillies*, *Crocus Vernus*, and some early *Tulippa's*. And they are all *Cold Planis*; Which therefore, (as it should seeme,) have a quicker *Perception* of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* have; As a *Cold Hand* will sooner finde a little *Warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Cowslips*, *Hyacinths*, *Rosemary-Flowers*, &c. And after them, *Pinks*, *Roses*, *Flowerdeluces*, &c. and the latest are *Gilly-Flowers*, *Holly-Oakes*, *Larkes-Foot*, &c. The *Earliest Blossomes* are, the *Blossomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of such *Trees*, as have much *Moisture*, either *Wairy*, or *Oily*. And therefore *Crocus Vernus* also, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Graines* are, first *Rie* and *wheat*; Then *Oas* and *Barley*; Then *Pease* and *Beanes*. For though *Greene Pease* and *Beanes* be eaten sooner, yet the *Drie Ones*, that are used for *Horse-Meat*, are ripe last; And it seemeth that the *Fatter Graine* commeth first. The *Earliest Fruits* are, *Strawberries*, *Cherries*, *Gooseberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Rassps*; And after them, *Damasins*, and most kinde of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-berries*, *Heps*, *Medlars*, *Servicees*, *Cornelians*, &c.

It is to be noted, that (commonly) *Trees* that ripen latest, *Blossome* soonest: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a *Worke* of *Providence*, that they *blossome* so soone; For otherwise, they could not have the *Sunne* long enough to ripen.

There be *Fruits*, (but rarely, that come twice a *Yeare*; as some *Peares*, *Strawberries*, &c. And it seemeth they are such as abound with *Nourishment*; Whereby after one *Period*, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*; commeth twice a *Yeare*; Especially the *Double White*; And that also is a *Plant* full of *Moisture*. *Roses* come twice, but it is not without *Cutting*, as hath beene formerly said.

In *Muscovia*, though the *Corn* come not up, till late *Spring*, yet their *Harvest* is as *Early* as *Ours*. The *Cause* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee see with us, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after those kinde of *Winters* likewise, the *Flowers*, and *Corn*, which are *Earlier*, and *Later*, doe come commonly at once, and at the same time; Which troubleth the *Husbandman* many times; For you shall have *Red-Roses*, and *Damaske Roses*, come together; And likewise the *Harvest* of *Wheat* and *Barley*. But this happeneth ever, for that the *Earlier* stayeth for the *Later*; And not that the *Later* commeth sooner.

There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Blossomes*, and *Young Fruits*, and *Ripe Fruits*, almost all the *Yeare*; succeeding one another. And it is said, the *Orange* hath the like with us, for a great Part of *Summer*;

Experiments
in Consort,
touching the
Seasons in
which Plants
come forth.

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Rance

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Heating

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M 2

Husbands:

Husbands doe suspect, that the Gaibering up of *Flints*, in *Flinty Ground*, and Laying them on *Heaps*, (which is much used,) is no good *Husbandry*; For that they would keepe the *Ground Warme*.

The *Sixth Helpe of Ground* is, by *Watering*, and *Irrigation*, which is in two *Manners*: The one by *Letting in*, and *Shutting out Waters*, at *seasonable Times*: For *Water*, at some *Seasons*, and with *reasonable stay*, doth good; But at some other *Seasons*, and with too long *Stay*, doth hurt. And this serveth onely for *Meadowes*, which are along some *River*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it travell to spread the *Water*. And this maketh an excellent *Improvement*, both for *Corn*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the *Fatnesse* of the *Earth*: But howsoever it profiteth much. Generally, where there are great *Overflowes*, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground warme*, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *Water* may not stay too long in the *Spring*, till the *Weeds* and *Sedge* be growne up; For then the *Ground* will bee like a *Wood*, which keepeth out the *Sunne*; And so continueth the *Wet*; Whereby it will never graze (to purpose) that yeare. Thus much for *Irrigation*. But for *Avoidances*, and *Drainings* of water, where there is too much, and the *Helpe of Ground* in that kinde, we shall speake of them in another Place.

NATU-



NATVRALL HISTORIE.

VII. Century.

THe Differences betwene *Animate* and *Inanimate Bodies*, we shall handle fully under the *Title of Life*, and *Living Spirits*, and *Powers*. We shall therefore make but a briefe *Mention* of them in this Place. The *Maine Differences* are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts* within them: But the *Maine Differences* betwene *Animate* and *Inanimate*, are two: The first is, that the *Spirits of Things Animate*, are all *Continued* with themselves, and are *Branched* in *Veines*, and *secret Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* have not onely *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not pervious one to another; As *Aire* is in *Snow*. The second *Maine Difference* is, that the *Spirits of Animate Bodies* are all in some degree, (more or lesse,) kindled and inflamed; And have a fine *Commixture* of *Flame*, and an *Aeriall Substance*. But *Inanimate Bodies* have their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* consisteth not in the *Heat* or *Coolnesse* of *Spirits*; For *Cloves* and other *Spices*, *Naptha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deale than *Oile*, *waxe*, or *Tallow*, &c.) but not *Inflamed*. And when any of those *Weake* and *Temperate Bodies* come to bee *Inflamed*, then they gather a much greater *Heat*, than others have *Un-inflamed*; besides their *Light*, and *Motion*, &c.

The *Differences*, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to *Spread* and *Continue* it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They have an *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period of Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succession*, and *propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

M 3

The

Experiments
in Confort,
touching the
Affinities, and
Differences, be-
tween Plants
and Inanimate
Bodies.

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The Differences between *Plants*, and *Metals* or *Fossiles* besides those four before mentioned (For *Metals* I hold Inanimate,) are these: First, *Metals* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604

There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metals* both; *Coral* is one of the Nearest of both *Kinds*: Another is *Vitriol*, for that is apt to sprout with *Moisture*.

605

Another speciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For in *Putrefaction* (if it dissolve not in *Arefaction*) will in the end issue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushrooms* and *Agaricks*, and other of those kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselves, and a Number of other things, after a *Mouldiness*, or *Rottiness*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which have *Affinitie* with *Plants*, have this Difference from them; That they have no *Succession* or *Propagation*, though they *Nourish*, and have a *Period* of *Life*, and have likewise some *Figure*.

606

I left once, by chance, a *Citron* cut, in a close *Roome*, for three Summer-moneths, that I was absent; And at my Returne, there were growne forth, out of the Pith cut, *Tuffs* of *Haires*, an Inch long, with little blacke Heads, as if they would have beene some *Herbe*.

Experiments touching the Affinitie, and Differences of *Plants*, and *Living Creatures*: And the Contacts and Participle of them.

607

The *Affinitie* and Differences betweene *Plants* and *Living Creatures*, are these that follow. They have both of them *Spirits Continued*, and *Branches*, and also *Influenced*: But first in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was also formerly said. And secondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And these two are the Radical Differences. For the Secondary Differences, They are, as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are *Severed*, and of themselves. Secondly, *Living Creatures* have *Local Motion*; *Plants* have not. Thirdly, *Living Creatures* nourish from their *Upper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Rootes*. Fourthly, *Plants* have their *Seed* and *Seminal Parts* uppermost; *Living Creatures* have them lowermost: And therefore it was said, not elegantly alone, but Philosophically; *Homo est Plantis inversa*; *Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* have a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* have more *Diversity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* have. Seventhly, *Living Creatures* have *Sense*, which *Plants* have not. Eighthly, *Living Creatures* have *Voluntary Motion*, which *Plants* have not.

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For the Difference of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Pine*, *Female-Pine*; *Male-Rose-mary*, *Female-Rose-mary*; *Male-Holly*, *Shoe-Holly*, &c. but Generation by *Copulation* (certainly) extendeth not to *Plants*. The nearest Approach of it, is betweene the *Hec-Palme*, and the *Shoe-Palme*; which, (as they report,) if they grow neare, incline the one to the other: In so much as, (that which is more strange,) they doubt not to report, that to keep the *Trees* upright from *Bending*, they tie *Ropes*, or *Lanes*, from the one to the other, that the *Contact* might be enjoyed by the *Concave* of a *Male Body*. But this may be *Feigned*, or at least *Amplified*. Nevertheless, I was apt enough to think, that this same *Impulsion* of a

Stronger

Stronger and a Weaker, like unto *Male*, and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Markes* of *Distinction* appeare: and it is doubled sometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in most *Species*.

The *Particples* or *Conjuncts* between *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and have no *Local Motion* of *Remove*, though they have a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a Fabulous Narration, that in the *Noriberne Countries*, there should be an *Herb* that groweth in the likeness of a *Lambe*, and feedeth upon the *Grasse*, in such sort, as it will bare the *Grasse* round about. But I suppose that the *Figure* maketh the *Fable*; For to wee see, there be *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, having a great *Stalke* and *Top*, doth prey upon the *Grasse*, a good way about, by drawing the *Juyce* of the *Earth* from it.

The *Indian Fig* boweth his *Roots* downe so low, in one yeare, as of it selfe it taketh *Root* againe: And so multiplyeth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The Cause is the *Plenty* of the *Sap*, and the *Softnesse* of the *Stalke*, which maketh the *Bough*, being over-loaden, and not stiffely upheld, weigh downe. It hath *Leaves*, as broad as a little *Targe*, but the *Fruit* no bigger than *Beanes*. The Cause is, for that the continuall *Shade* increaseth the *Leaves*, and abateth the *Fruit*; which nevertheless is of a pleasant Taste. And that (no doubt) is caused, by the *Suppleness* and *Gentleness* of the *Juyce* of that *Plant*, being that which maketh the *Boughes* also so Flexible.

It is reported by one of the *Ancients*, that there is a certain *Indian Tree*, having few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit* being of good Taste, groweth out of the *Barke*. It may be, there be *Plants* that poure out the *Sap* so fast, as they have no leisure, either to divide into many *Leaves*, or to put forth *Stalkes* to the *Fruit*. With us *Trees* (generally) have small *Leaves* in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaves* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Colewort*. The Cause is, (like to that of the *Indian Fig*,) the hasty and plenifull Putting forth of the *Sap*.

There be three *Things* in use for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little used. It is found in *Canes*: *Quere*, whether to the first *Knuckle*, or further up? And whether the very *Barke* of the *Cane* it selfe doe yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I have heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that bee hath knowne in the beginning of *May*, *Honey-Combes* empty of *Honey*; And within a fortnight, when the *Sweet Dewes* fall, filled like a *Cellar*. It is reported by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the *Valleys* of *Hircania*, that distilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Tears* of some *Trees*, may be sweet. It may be also, that some sweet *Juyces*, fit for many uses, may be concocted out of *Fruits*, to the *Thicknesse* of *Honey*, or perhaps of *Sugar*; The likeliest are *Rasins* of the *Sunne*, *Figs*, and *Corrans*: The *Meanes* may be enquired.

The *Ancients* report of a *Tree*, by the *Persian Sea*, upon the *Shore-Sands*, which

Experiments touching Promiscuous Plants.

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which is nourished with the *Salt-water*; And when the *Tide* ebbereth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*;) and grasping the *Sands* like a *Crab*; Which neverthelesse beareth a *Fruit*. It were good to trie some *Hard Trees*, as a *Service-Tree*, or *Pierre-Tree*, by setting them within the *Sands*.

614 There bee of *Plants*, which they use for *Garments*, these that follow. *Hemp*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous Matter*, commonly; And sometimes the *Downe* that groweth above.

615 They have, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepe*th. There bee *Sleepers* enough then; For almost all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that have a *Mossy* or *Downy Root*; And likewise that have a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches*, and *Impossours* make an ugly *Image*, giving it the *Forme* of a *Face* at the *Top* of the *Root*, and leave those *Sirings* to make a broad *Beard* down to the *Foot*. Also there is a *Kinde* of *Nard*, in *Cree*t, (being a *Kinde* of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doves* foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the *Sap* fasteneth most to the *Aire*, and *Sunne*: In the *Fibrous*, the *Sap* delighteth more in the *Earth*, and therefore putteth downward: And the *Hirsute* is a *Middle* betweene both; That besides the *Putting* forth upwards, and downwards; putteth forth in *Round*.

617 There are some *Tears* of *Trees*, which are kembered from the *Beards* of *Goats*: For when the *Goats* bite and crop them, especially in the *Mornings*, the *Dew* being on, the *Teare* commeth forth, and hangeth upon their *Beards*: Of this Sort is some *kinde* of *Ladonum*.

618 The *Irrigation* of the *Plane-Tree* by *Wine*, is reported by the *Ancients*, to make it *Fruitfull*. It would be tried likewise with *Roots*; For upon *Seeds* it worketh no great *Effects*.

619 The way to carry *Forraine Roots*, a long *Way*, is to vesseil them close in *Earthen Vessels*. But if the *Vessels* be not very *Great*, you must make some *Holes* in the *Bottom*, to give some *Refreshment* to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate.

620 The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the *Dryest*; And those *Things*, which are knowne to comfort other *Plants*, did make that more *Sterill*: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other *kindes*, where commonly *Plants* doe not thrive: Neither did it love the *Sunne*: There might be one *Cause* of all those *Effects*; Namely, the sparing *Nourishment*, which that *Plant* required. Where how farre *Cassia*, which is now the *Substitute* of *Cinnamon*, doth participate of these *Things*.

621 It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly flayed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe devour the *Pith* and *Marrow* of it; and so make it *Hollow*; But Meddle not with the *Barke*, because to them it is bitter.

622 There were, in *Ancient Time*, *Vines*, of farre greater *Bodies*, then we know any; There have been *Cups* made of them; and an *Image* of *Jupiter*. But it is like they were *Wild Vines*; For the *Vines*, that they use for *Wine*, are so often

often Cut, and so much Digged and Dressed, that their *Sap* spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twigges*, while they are green, so brittle, yet the *Wood* dried is extreme *Tough*; And was used by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgells*.

It is reported, that in some *Places*, *Vines* are suffered to grow like *Herbs*, spreading upon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make triall, whether *Plants* that use to bee borne up by *Props*, will not put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Ivie*, *Woodbine*, &c.

Quinces, or *Apples*, &c. if you will keep them long, drowne them in *Honey*; But because *Honey* (perhaps) will give them a *Taste* Overluscious, it were good to make *Triall* in *Powder* of *Sugar*; Or in *Syrup* of *Wine* onely *Boyled* to *Height*. Both these would likewise be tried in *Oranges*, *Lemons*, and *Pomegranats*; For the *Powder* of *Sugar*, and *Syrup* of *Wine*, will serve for times more than once.

The *Conservation* of *Fruit* would be also tried in *Vessels*, filled with *Fine Sand*, or with *Powder* of *Chalke*; Or in *Meale* and *Flower*; Or in *Dust* of *Oake-wood*; Or in *Mill*.

Such *Fruits*, as you appoint for *Long Keeping*, you must gather before they be full *Ripe*; And in a *Faire* and *Drie Day*, towards *Noone*; And when the *Winde* bloweth not *South*; And when the *Moone* is under the *Ear*; And in *Decrease*.

Take *Grapes*, and hang them in an *Empty Vessel*, well *Stopped*; And set the *Vessel*, not in a *Cellar*, but in some *drie Place*; And it is said, they will last long. But it is reported by some, they will keepe better, in a *Vessel* halfe full of *wine*, so that the *Grapes* touch not the *Wine*.

It is reported, that the *Preserving* of the *Stalke*, helpeth to preserve the *Grape*; Especially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

It is reported by some of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* under *water*, will keep long.

Of *Herbs* and *Plants*, some are good to eat *Raw*; As *Lettuce*, *Endive*, *Purslane*, *Tarragon*, *Cressets*, *Cucumbers*, *Musk-Melons*, *Radish*, &c. Others onely after they are *Boyled*, or have *Passed the Fire*; As *Parsley*, *Clary*, *Sage*, *Parshnips*, *Turnips*, *Asparagus*, *Artichoakes*, (though they also being young are eaten *Raw*;) But a Number of *Herbs* are not *Esculent* at all; As *Worme-Wood*, *Grasse*, *Greene-Corne*, *Centory*, *Hyssope*, *Lavender*, *Balm*, &c. The *Causes* are, for that the *Herbs*, that are not *Esculent*, doe want the two *Tastes*, in which *Nourishment* resteth; Which are, *Fat*, and *Sweet*; And have (contrariwise) *Bitter*, and *Over-strong Taste*, or a *Iuyce* so *Crude*, as cannot bee ripened to the degree of *Nourishment*. *Herbs* and *Plants*, that are *Esculent* *Raw*, have *Fainesse*, or *Sweetnesse*, (as all *Esculent Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it must be such a *Fainesse*, (for as for *Sweet Things*, they are in effect alwayes *Esculent*;) as is not *Over-grosse*, and *Loading* of the *Stomach*; For *Parshnips* and *Leekes* have *Fainesse*; But it is too *Grosse* and *Heavy* without *Boyling*. It must be also in a *Substance* somewhat *Tender*; For wee see *Wheat*, *Barley*, *Artichoakes*, are no good *Nourishment*, till they have passed the *Fire*; But the *Fire* doth ripen, and maketh them soft and tender, and so they become *Esculent*. As for *Radish*, and *Tarragon*, and the like, they are for *Condiments*, and not for *Nourishment*. And even some of those *Herbes*, which are not *Esculent*,

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There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Stem*; Except it bee the *Treethat beareth Sanguis Draconis*: Which groweth (chiefly) in the *Iland Soquatra*: The *Herbe Amaranthus*, (indeed,) is *Red all over*; And *the fill is Red* in the *Wood*: And so is *Red Sanders*. The *Tree of the Sanguis Draconis*, groweth in the forme of a *Sugar-Loafe*. It is like, the *Sap of that Plant*, concocteth in the *Body of the Tree*. For we see that *Grapes*, and *Pomegranats*, are *Red in the Iuyce*, but are *Greene in the Teare*: And this maketh the *Tree of Sanguis Draconis*, lesser towards the *Top*; Because the *Iuyce* hasteneth not up; And besides, it is very *Astringent*; And therefore of *Slow Motion*.

642

It is reported, that *Sweet Mosse*, besides that upon the *Apple-Trees*, groweth likewise (sometimes) upon *Poplars*; And yet (generally) the *Poplar* is a *Simpoth Tree of Barke*, and hath little *Mosse*: The *Mosse of the Larix Tree* burneth also sweet, and sparkleth in the *Burning*. *Quare of the Mosses of Odoriferous Trees*: As *Cedar*, *Cypres*, *Lignum Alois*, &c.

643

The *Death* that is most without *Paine*, hath bene noted to be, upon the *Taking of the Potion of Hemlocke*, which in *Humanity* was the *Forme of Execution of Capitall Offenders in Athens*. The *Passion of the Aspe*, that *Cleopatra* used, hath some affinity with it: The *Cause* is, for that the *Torments of Death* are chiefly raised by the *Strife of the Spiritus*; And these *Vapours* quench the *Spiritus* by *Degrees*; Like to the *Death* of an extreme *Old Man*. I conceive it is lesse *Painfull* than *Opium*, because *Opium* hath *Parts of Heat mixed*.

644

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*: So *Pomell-Seeds* are *Sweet* before they ripen, and after grow *Spicy*. And some never ripen to be *Sweet*: As *Tamarinds*, *Barberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former *Kinde* have much and *subtile Heat*, which caueth *Early Sweetness*; The latter have a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath *Parts of Contrary Natures*; For it is *Sweet*, and yet *Astringent*.

645

There be few *Herbs* that have a *Salt Taste*; And contrariwise all *Bloud of Living Creatures* hath a *Salineffe*: The *Cause* may be, for that *Salt*, though it be the *Rudiment of Life*, yet in *Plants* the *Original Taste* remaineth not; For you shall have them *Bitter*, *Sower*, *Sweet*, *Biting*, but seldom *Salt*: But in *Living Creatures*, all those *High Tastes* may happen to be (sometimes) in the *Humours*, but are seldom in the *Flesh*, or *Substance*: Because it is of a more *Oyle Nature*, which is not very *Susceptible* of those *Tastes*; And the *Salineffe* is selfe of *Bloud*, is but a *light*, and *secret Salineffe*: And even among *Plants*, some doe participate of *Salineffe*, as *Alga Marina*, *Sampshire*, *Scorvy-Grasse*, &c. And they report, there is, in some in the *Indian Seas*, a *Swimming Plant*, which they call *Salgazin*, spreading over the *Sea*, in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Ashes*, of all *Plants*, they extract a *Salt*, which they use in *Medicines*.

646

It is reported by one of the *Ancients*, that there is an *Herbe* growing in the *Water*, called *Lincostis*, which is full of *Prickles*: This *Herbe* putteth forth another *small Herbe* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betwene the *Prickles*, which *Purified by the Sunne*, Germi- neth. But I remember also I have seene, for a great *Rarity*, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallans*.

647

Barley, (as appeareth in the *Making*), being steeped in *Water* three dayes, and the *Water* drained from it, and the *Barley* layed upon a *drie floor*, will sprout, halfe an *Inch* long at least: And if it bee let alone, and

not

not turned, much more; untill the *Heart* be out. *Wheat* will doe the same. Trye it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vire*; For there it is of the old *Store*, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be tur- der driven: For it appeareth already, by that which hath bene said, that *Earth*, is not necessary to the first *Sprouting of Plants*; And we see that *Rose-Buds* set in *Water*, will *Blow*: Therefore trye whether the *Sprouts* of such *Graines* may not be raised to a further *Degree*; As to an *Herbe*, or *Flower*, with *Water* onely; Or some small commixture, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Rose*, that they will come farre faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may give some light also, that *Drink* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Trye the same *Expe- riment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then drie it, and see whether it will sprout.

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Malt in the *Dreaching* will swell; And that in such a manner, as after the *Putting forth in Sprouts*, and the *drying* upon the *Keele*, there will be gain- ed at least a *Bushell* in eight, and yet the *Sprouts* are rubbed off; And there will be a *Bushell of Dust* besides the *Malt*: Which I suppose to be, not onely by the *loose*, and open *Laying of the Parts*, but by some *Addition of Sub- stance*, drawne from the *Water*, in which it was steeped.

649

Malt gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in the *Wort*. The *Dulcoration of Things* is worthy to be tried to the full; For that *Dulcoration* importeth a *degree to Nourishment*: And the *Making of Things Inalimementall*, to become *Alimentall*, may be an *Experiment* of great *Profit*, for *Making new Viuals*.

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Molt *Seeds* in the *Growing*, leave their *Husk* or *Rinde* about the *Root*; But the *Onion* will carry it up, that it will be like a *Cap* upon the *Top* of the *Young Onion*. The *Cause* may be, for that the *Skin* or *Husk* is not easie to break; as we see by the *Pilling of Onions*, what a holding *Substance* the *Skin* is.

651

Plants, that have *Curled Leaves*, doe all abound with *Moisture*; Which commeth so fast on, as they cannot spread themselves *Plain*, but must needs gather together. The *Weakest Kinde of Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The *Second* is *Curling* on the *Sides*; As in *Lettuce*, and *Young Cabbage*: And the *Third* is *Folding into an Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*.

652

It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Purified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like *Hard Sugar*.

653

The *Roots of Trees* doe, (some of them,) put downwards deepe into the *Sur-ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Sur- face of the Earth*; As the *Alb*, *Cypresse-Tree*, *Olve*, &c. The *Cause* of this lat- ter may be, for that such *Trees* as love the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot up much; For in their *Body*, their desire of *Approach to the Sunne*, maketh them spread the lesse. And the same Reason, under *Ground*, to avoid *Recess* from the *Sunne*, maketh them spread the more. And we see it commeth to passe in some *Trees*, which have bene planted too deepe in the *Ground*, that for love of *Approach to the Sunne*, they forsake their first *Root*, and put out another more towards the *Top of the Earth*. And wee see also, that the *Olive* is full of *Oyle Iuyce*; And *Alb* maketh the best *Fire*; And

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Cypresse

Cypresse is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loveth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they have so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that have the same difference; As the *Herbe* they call *Morsus Diaboli*; which putteth the *Root* downe so low, as you cannot pull it up without *Breaking*; Which gave Occasion to the *Wame*, and *Pable*; For that it was said, it was so low some a *Root*, that the *Devil*, when it was gathered, bit it for *Envy*: And some of the *Ancients* doe report, that there was a goodly *Firre*, (which they desired to remove whole, that had a *Root* under *Ground* eight Cubits deep; And so the *Root* came up broken.

654 It hath beene observed, that a *Branch* of a *Tree*, being *Vnbarked* some space at the *Bottom*, and so set into the *Ground*, hath grown; even of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, above *Ground*, will die. The *Cause* may be, for that the *Vnbarked Part* draweth the *Nourishment* best, but the *Barke* continueth it onely.

655 *Grapes* will continue *Fresh*, and *Moist*, all *Winter* long, if you hang them, *Cluster by Cluster*, in the *Rooff* of a *Warre Roome*, Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stocke*.

656 The *Reed* or *Cane* is a *Warry Plant*, and groweth not but in the *Water*; It hath these *Properties*; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; that being *Drye*, it is more *Hard* and *Fragile*, than other *Wood*, That it putteth forth no *Boughs*, though many *Stalks* out of one *Root*. It differeth much in greatnesse; The smallest being fit for *Thatching* of *Houses*; And *Stopping* the *Chinkes* of *Ships*; Better than *Glew*, or *Pitch*. The *Second Bignesse*, is used for *Angle-Rods*, and *Staves*; And in *China* for *beating* of *Offenders* upon the *Thighs*. The differing *Kinds* of them are; The *Common Reed*; The *Cassia Pistula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most *Nourishment* from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hollowest* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Wairie* and *Cleave*, As that of *Vines*; of *Beeches*; of *Peares*. Some *Thick*, As *Apples*. Some *Gummy*, as *Cherries*. Some *Froathy*, As *Elmes*. Some *Milkie*, As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* onely; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will bee *drie*. The *Trees*, which have the *Moistest Juices* in their *Fruit*, have commonly the *Moistest Sap* in their *Bodie*; For the *Vines* and *Peares* are very *Moist*; *Apples* somewhat more *Spongie*: The *Milke* of the *Figge* hath the *Qualitie* of the *Rennet*, to gather *Cheese*: And so have certaine *Soure Herbs* wherewith they make *Cheese* in *Lein*.

658 The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*; And it is a good *Trial*, to trie it by *Speaking* at one *End*, and *Laying* the *Eare* at the *Other*: For if it be *Knottie*, the *Voice* will not passe well. Some have the *Veines* more varied and *chamlored*; As *Oake*, whereof *Wain-skin* is made; *Maple*, whereof *Trenchers* are made: Some more *Smooth*, as *Firre* and *Walnut*: Some doe more easily breed *Wormes* and *Spiders*; Some more *hardly*, as it is said of *Irish Trees*: Besides there bee a *Number* of *Differences* that concerne their *Use*; As *Oake*, *Cedar*, and *Chestnut*, are the

the best *Builders*: Some are best for *Plough-Timber*; As *Ash*; Some for *Peeres*, that are sometimes wet, and sometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *Walrus*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* *Tough*, and not apt to rift with *Ordinance*; Wherein *English* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre* and *Pine*, because of their *Length*, *Straightnesse*, and *Lightnesse*: Some for *Pale*; As *Oake*: Some for *Fuall*; As *Ash*: And so of the rest.

The *Commig* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casual*: For many have beene translated, and have prospered well; As *Damaske-Roses*, that have not beene knowne in *England* above an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerely *Natural*; As the *Firre* and *Pine* love the *Mountaines*; The *Poplar*, *Willow*, *Sallow*, and *Alder*, love *Rivers*, and *Moist Places*: The *Ash* loveth *Coppices*; But is best in *Standards* alone: *Juniper* loveth *Chalke*; And so doe most *Fruit-Trees*: *Sampire* groweth but upon *Rockes*: *Reeds* and *Osfers* grow where they are washed with *Water*: The *Vine* loveth *Sides* of *Hills*, turning upon the *South-East-Sunne*, &c.

The *Putting forth* of certaine *Herbs* discovereth of what *Nature* the *Ground* where they put forth, is: As *Wilde Thyme* sheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* shew *Grounds* fit for *Wood*: *Camomill* sheweth *Mellow Grounds* fit for *wheat*. *Mustard-Seed* growing after the *Plough*, sheweth a good *Strong Ground* also for *wheat*: *Burnet* sheweth good *Meadow*: And the like.

There are found, in divers *Countries*, some other *Plants*, that grow out of *Trees*, and *Plants*, besides *Misseltow*: As in *Syria*, there is an *Herb* called *Cassias*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Fauno*, upon the *Wilde Olive*. And an *Herbe* called *Hippophaeton* upon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sicknesse*.

It hath bin observed, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds* are thought to be great *Enemies* to *Fruit*, yet nevertheless *South-Winds* are also found to doe *Hurt*; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West Winds* are the best. It hath been observed also, that *Greene* and *Open Winters* doe hurt *Trees*; Inasmuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will die. The *Cause* is the same with the former, because the *Lust* of the *Earth* overspendeth it selfe; Howsoever some other of the *Ancients* have commended *Warre Winters*.

Snowes, lying long, cause a *Fruitfull Yeare*; For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Tear*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Froth* of the *Cloudy Waters*.

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Olives*, *Pomegranates*; Yet it is rather for *Plenty*, than for *Goodnesse*; For the best *Wines* are in the *Driest Vintages*: *Small Showers* are likewise good for *Corn*, so as *Parching Heats* come not upon them. Generally, *Night-Showers* are better than *Day-Showers*;

Showers; For that the *Sunne* followeth not so fast upon them: and wee see, even in *Waring* by the *Hand*, it is best, in *Summer* time, to water in the *Evening*.

665

The *Differences* of *Earths*, and the *Triall* of them, are worthy to bee diligently inquired. The *Earth*, that with *Showers* doth easiliest *Soften*, is commended; And yet some *Earth* of that kinde will be very *Drie*, and *Hard* before the *Showers*. The *Earth* that casteth up from the *Plough*, a great *Clod*, is not so good, as that, which casteth up a *Smaller Clod*. The *Earth*, that putteth forth *Mosse* easily, and may be called *Mouldie*, is not good. The *Earth*, that smelleth well upon the *Digging*, or *Ploughing*, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well be; For that the *Earth* is most *Rosie*: And therefore it is commended for a *Signe* of good *Earth*. The *Pooreness* of the *Herbs*, (it is plaine,) shew the *Pooreness* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *Whiter*, or *Blasted* at the *Top*, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossiness* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sunne*, and *Toasted*, is commonly *Forced Earth*, and *Barren* in his owne *Nature*. The *Tender*, *Cheffome*, and *Mellow Earth*, is the best; Being meere *Mould*, between the two *Extremes* of *Clay*, and *sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Iuyce*.

666

It is strange, which is observed by some of the *Ancients*, that *Dust* helpeth the *Fruitfulness* of *Trees*; and of *Vines*, by name: Inasmuch as they cast *Dust* upon them of purpose. It should seeme, that that *Powdring*, when a *Shower* commeth, maketh a kinde of *Soyling* to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that *Countries*, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667

It is commended by the *Ancients*, for an *Excellent Helpe* to *Trees*, to lay the *Stalkes*, and *Leaves* of *Lupines* about the *Roots*; Or to *Plough* them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them upon *land*, doth much *Good*. And it was generally received of old, that *Dunging* of *Grounds*, when the *West Winde* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more *thirsty*, and open, to receive the *Dung*.

668

The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in use: The *Ancients* had it, and that three wayes: The first was *Infusion*, which is the Ordinary manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and putting in the *Cions* there: And the Third was *Paring* of two *Vines*, that grow together, to the *Marrow*, and *Binding* them close.

669

The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And would be more worthy to be enquired, if it were in *Mens* Power to helpe them; Whereas many of them are not to be remedied. The *Milk-dew* is one of the *Greatest*; which (out of question) commeth by *Clofenesse* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldome commeth; Such as is with us *York's wold*. This cannot be remedied, otherwise than that in *Countries* of small *Enclosure*, the *Grounds* be turned into larger *Fields*: Which I have knowne to doe good in some *Farmes*. Another *Disease* is the *Putting forth* of *Wilde Oates*, whereinto *Corne* oftentimes, (especially *Barley*), doth degenerate. It happeneth chiefly from the

the *Weaknesse* of the *Graine* that is sown; For if it bee either too *Old*, or *Mouldy*, it will bring forth *Wilde Oats*. Another *Disease* is the *Saciete* of the *Ground*; For if you sow one *Ground* still with the same *Corne*, (I meane not the same *Corne* that grew upon the same *Ground*,) but the same *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c.) it will prosper but *poorely*: Therefore besides the *Resting* of the *Ground*, you must vary the *Seed*. Another ill *Accident* is, from the *Wind*, which hurt at two times; At the *Flouring*, by *shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drowth*, at the *Spindling* of the *Corne*; Which with us is rare; But in *Hotter Countries*, common: Inasmuch as the *Word*, *Calaminus*, was first derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-wet* at *Sowing-Time*; which with us breedeth much *Dearth*; Inasmuch as the *Corne* never commeth up; And (many times) they are forced to re-sow *Summer-Corne*, where they sowed *Winter-Corne*. Another ill *Accident* is *Bitter Frosts*, continued, without *Snow*; Especially in the *Beginning* of the *Winter*, after the *Seed* is new sown. Another *Disease* is *Wormes*; which sometimes breed in the *Root*, and happen upon *Hot Sunnes*, and *Showres*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it selfe; Especially when *Hot Sunnes* breake often out of *Clouds*. Another *Disease* is *Weeds*; And they are such, as either *Choak*, and *Over-shadow* the *Corne*, and beare it downe; Or starve the *Corne*, and deceive it of *Nourishment*. Another *Disease* is, *Over-Ranknesse* of the *Corne*; Which they use to remedy, by *Mowing* it after it is come up; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raine*, meare, or in *Harvest*. Another ill *Accident* is, if the *Seed* happen to have touched *Oyle*, or any *Thing*, that is *Fat*; For those *Substances* have an *Antipathy* with *Nourishment* of *Water*.

670

The *Remedies* of the *Diseases* of *Corne* have beene observed as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preservative*: The *Mingling* of *Seed-Corne* with *Ashes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* sound: It hath not beene praised, but it is thought to be of use; to make some *Misellane* in *Corne*; As if you sow a few *Beanes* with *Wheat*; your *Wheat* will be the better. It hath beene observed, that the *Sowing* of *Corne* with *Houf-lecke*, doth good. Though *Graine*, that toucheth *Oyle*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to *Putrifie*, (which they call *Amurca*), is thought to assure it against *Wormes*. It is reported also, that if *Corne* bee *Mowed*, it will make the *Graine* *Longer*, but *Emptier*, and having more of the *Huske*.

671

It hath beene noted, that *Seed* of a *yeare* old, is the *Best*; And of two or three *yeares* is worse; And that which is more *Old*, is quite *Barren*; Though (no doubt) some *Seed* and *Graines* last better than others. The *Corne*, which in the *Vanning* lieth lowest, is the best: And the *Corne*, which is broken or bitten retaineth a little *Yellownesse*, is better than that which is very *Whise*.

672

It hath beene observed, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Inasmuch as it hath beene knowne to goe three *Cubits* deep; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold*, and *Acide Herb*; that (as it seemeth) loveth the *Earth*, and is not much drawne by the *Sunne*.

673

It hath beene observed, that some *Herbs* like best, being watered with *Salt-Water*; And *Radish*, *Beer*, *Rew*, *Pennyroyall*, This *Triall* would be extended to

to some other Herbs, Especially such as are Strong; As Tarragon, Mustard-Seed, Rocket, and the like.

674

It is strange that is generally received, how some Poisonous Beasts affect Odorous and Balsam Herbs. As that the Snake loveth Fennell; That the Toad will be much under Sage; That Frogs will be in Cinquefoile. It may be, it is rather the Shade, or other Coverture, that they take liking in, than the Vertue of the Herb.

675

Item a Matter of great Profit, (save that I doubt it is too Conjecturall to venture upon,) if one could discern, what Cornes, Herbs, or Fruits, are like to be in Plenty, or Scarcity, by some Signes and Prognosticks, in the Beginning of the Year: For as for those, that are like to be in Plenty, they may be bargained for, upon the Ground; As the Old Relation was of Thales; who to show how easie it was for a Philosopher to be rich, when he fore-saw a great Plenty of Olives, made a Monopoly of them. And for Scarcitie, Men may make Profit in keeping better the Old Store. Long Continuance of Snow is beleeved to make a Fruitfull Year of Corn: An Early Winter, or a very Late Winter, a Barren Year of Corn: An Open and Serene Winter, an ill Year of Fruit: These we have partly touched before; But other Prognosticks of like Nature are diligently to be enquired.

676

There seeme to be, in some Plants, Singularities, wherein they differ from all Other; The Olive hath the Oyle Part, onely on the Outside; Whereas all other Fruits have it in the Meate, or Kernel. The Firre hath (in effect) no Stone, Nor, nor Kernel; Except you will count the little Graines Kernells. The Lemon, and the Pine-Apple have onely, amongst Fruits, Graines distinct in several Cells. No Herb hath Curled-Leaves, but Cabbage, and Cabbage-Lettuce. None have double Leaves, one belonging to the Stalk, another to the Fruit, or Seed, but the Arichake: No Flower hath that kind of Spread that the Wood-bine hath. This may be a large Field of Contemplation; For it sheweth that in the Frame of Nature, there is, in the Producing of some Species, a Composition of Matter, which happeneth oft, and may be much diversified: In others, such as happeneth rarely, and admitteth little Variety: for so it is likewise in Beasts: Dogs have a Resemblance with Wolves, and Foxes; Horses with Assees, and with Buffes; Hares with Conies; &c. And so in Birds: Ravens and Crows have a Resemblance with Hawks; Common Doves with Ring-Doves, and Pouter; Black Birds with Thrushes and Mavis; Crows with Ravens, Ducks, and Choughs, &c. But Elephants, and Swine amongst Beasts; And the Bird of Paradise, and the Peacocke amongst Birds; And some few others, have scarce any other Species, that have Affinity with them.

We leave the Description of Plants, and their Vertues, to Herballists, and other like Bookes of Naturall History: Wherein Mens Diligence hath beene great, even to Curiositie: For our Experiments are onely such, as doe ever ascend a Degree to the Deriving of Causes, and Extracting of Axiomes, which, we are not ignorant, but that since, both of the Ancient, and Moderne Writers, have also laboured; But their Causes, and Axiomes, are full of Imagination, and so infected with the old Received Theories, as they are more Inquisitions of Experience, and

It

It hath beene observed, by some of the Ancients, that Skins, (especially of Rammes,) newly pulled off, and applyed to the Wounds of Stripes, doe keepethem from Swelling, and Exulcerating; And likewise Heale them, and Close them up; And that the Whites of Egges doe the same. The Cause is a Temperate Conglutination; For both Bodies are Clammy, and Viscous, and doe bridle the Deflux of Humours to the Hurts, without Penning them in too much.

You may turne (almost) all Flesh into a Fatty Substance, if you take Flesh, and cut it into Peeces, and put the Peeces into a Glasse covered with Parchment; And so let the Glasse stand six or seven Houres in Boiling Water. It may be an Experiment of Profit, for Making of Fat, or Grease, for many uses; But then it must be of such Flesh as is not Edible; As Horses, Dogs, Beares, Foxes, Badgers, &c.

It is reported by one of the Ancients, that New Wine, put into Vessels well stopp'd, and the Vessels let downe into the Sea, will accelerate very much, The Making of them Ripe, and Potable. The same would be tried in Wort.

Beasts are more Hairy than Men; And Savage Men more than Civill; And the Plumage of Birds exceedeth the Pilositie of Beasts. The Cause of the Smoothnesse in Men, is not any Abundance of Heat, and Moisture, though that indeed causeth Pilositie; But there is requisite to Pilosity, not so much Heat and Moisture, as Excrementitious Heat and Moisture: (For whatsoever assimilateth, goeth not into the Haire:) And Excrementitious Moisture aboundeth most in Beasts, and Men that are more Savage. Much the same Reason is there of the Plumage of Birds; For Birds assimilate lesse, and excrete more than Beasts: for their Excrements are ever liquid and their Flesh (generally) more drie: Beside, they have not Instruments for Urine, And so all the Excrementitious Moisture goeth into the Feathers: And therefore it is no Marvell, though Birds be commonly better Meate than Beasts, because their Flesh doth assimilate more finely, and fecerth more subtilly: Again, the Head of Man hath Haire upon the first Birth, which no other Part of the Body hath. The Cause may be Want of Perspiration: For Much of the Matter of Haire, in the other Parts of the Body, goeth forth by Insensible Perspiration; And besides, the Skull being of a more solide Substance, nourisheth and assimilateth lesse, and excretneth more: And so likewise doth the Chinne, We see also that Haire cometh not upon the Palmes of the Hands, nor Soales of the Feet; Which are Parts more Perspirable. And Children likewise are not Hairy, for that their Skins are more Perspirable.

Birds are of swifter Motion than Beasts: For the Flight of many Birds is swifter, than the Race of any Beasts. The Cause is, for that the Spirits in Birds, are in greater Proportion, in comparison of the Bulke of their Body, than in Beasts: For as for the Reason that some give, that they are partly Carried, whereas Beasts goe, that is Nothing; For by that Reason Swimming should be swifter, than Running: And that Kinde of Carriage also, is not without Labour of the Wing.

The Sea is Clearer, when the North-Wind bloweth, than when the South-Wind. The Cause is, for that Salt-water hath a little Oyle in the Surface thereof; As appeareth in very Hot Dayes: And againe, for that the

Experiment
Solitary, touching
Healing
of Wounds.

677

Experiment
Solitary, touching
Fat dissolved
in Flesh.

678

Experiment
Solitary, touching
Ripening
of Drinke before
the Time.

679

Experiment
Solitary, touching
Pilosity
and Plumage.

680

Experiments
Solitary, touching
the Quicknesse of
Motion in
Birds.

681

Experiment
Solitary, touching
the different Clear-
nesse of the
Sea.

682

Souberne

Southerne Wind relaxeth the Water somewhat; As no Water Boylng is so Cleare as Cold Water.

Experiment
Solitary, touch-
ing the
Heats of Fire
and Boylng
Water.

683

Fire burneth Wood, making it first Luminous; Then Black and Brittle; And lastly, Broken and Incinerate: Scalding Water doth none of these. The Cause is, for that by Fire, the Spirit of the Body is first Refined, and then Emitted; Whereof the Refining, or Attenuation causeth the Light; And the Emission, first the Fragilitie, and after the Dissolution into Ashes: Neither doth any other Body enter: But in Water the Spirit of the Body is not Refined so much; And besides Part of the Water entereth; Which doth increase the Spirit, and in a degree extinguish it: Therefore wee see that Hot Water will quench Fire. And againe wee see, that in Bodies, wherein the Water doth not much enter, but onely the Heat passeth, Hot Water worketh the Effects of Fire: As in Egges Boyled and Roasted, (into which the Water entereth not at all) there is scarce difference to be discerned; But in Fruit, and Flesh, whereinto the Water entereth, in some Part, there is much more difference.

Experiment
Solitary, touch-
ing the
Qualification
of Heat by
Moisture.

684

The Bottom of a Vessell of Boylng Water, (as hath beene observed,) is not very much Heated, So as Men may put their Hand under the Vessell, and remove it. The Cause is, for that the Moisture of Water, as it quenchereth Coales, where it entereth; So it doth allay Heat, where it toucheth: And therefore note well, that Moisture, although it doth not passe thorow Bodies, without Communication of some Substance, (As Heat and Cold doe;) yet it worketh manifest Effects; not by Entrance of the Body, but by Qualifying of the Heat, and Cold; As we see in this Instance: And wee see likewise, that the Water of Things distilled in Water, (which they call the Bath) differeth not much from the Water of Things Distilled by Fire: We see also, that Pewter-Dishes, with Water in them, will not Melt easily; But without it, they will; Nay we see more, that Butter, or Oile, which in themselves are Inflammable, yet by the Vertue of their Moisture; will doe the like.

Experiment
Solitary, touch-
ing Taw-
ning.

685

It hath beene noted by the Ancients, that it is dangerous to Picke ones Eare, whilst he Tawneth. The Cause is, for that in Tawning, the Inner Parchment of the Eare is extended, by the Drawing in of the Spirit, and Breath. For in Tawning, and Sighing both, the Spirit is first strongly Drawne in, and then strongly Expelled.

Experiment
Solitary, touch-
ing the
Hiccough.

686

It hath beene observed by the Ancients, that Sneezing doth cease the Hiccough. The Cause is, for that the Motion of the Hiccough is a Lifting up of the Stomack; which Sneezing doth somewhat deposite, and divert the Motion another way. For first we see, that the Hiccough commeth of Fulnesse of Meat, (especially in Children,) which causeth an Extension of the Stomack: Wee see also, it is caused by Acide Meats, or Drinkes, which is by the Pricking of the Stomack: And this Motion is ceased either by Diversion, Or by Detention of the Spirits: Diversion, as in Sneezing; Detention, as wee see Holding of the Breath, doth helpe somewhat to cease the Hiccough: And putting a Man into an earnest Study doth the like: As is commonly used: And Vinegar put to the Nostrils, or Gargarized, doth it also; For that it is Astringent, and inhibiteth the Motion of the Spirit.

Experiment
Solitary, touch-
ing Sneez-
ing.

687

Looking against the Sunne, doth induce Sneezing. The Cause is, not the Holding of the Nostrils; For then the holding up of the Nostrils against the

the Sunne, though one Winke, would doe it; But the Drawing downe of the Moisture of the Brain: For it will make the Eyes runne with Water; And the Drawing of Moisture to the Eyes, doth draw it to the Nostrils, by Motion of Consent; And so followeth Sneezing; As contrariwise, the Tugging of the Nostrills within, doth draw the Moisture to the Nostrills, and to the Eyes by Consent; For they also will Water. But yet, it hath beene observed, that if one be about to Sneeze, the Rubbing of the Eyes, till they runne with Water, will prevent it. Whereof the Cause is, for that the Humour, which was descending to the Nostrills, is diverted to the Eyes.

The Teeth are more, by Cold Drinks, or the like, affected, than the other Parts. The Cause is double, The One, for that the Resistance of Bones to Cold, is greater than of Flesh; for that the Flesh shrinketh, but the Bones resisteth, whereby the Cold becommeth more eager: The Other is, for that the Teeth, are Parts without Blood; Whereas Blood helpeth to qualifie the Cold: And therefore wee see, that the Sinewes are much affected with Cold; For that they are Parts without Blood: So the Bones in Sharpe Colliculose Brittle: And therefore it hath beene scene, that all Compositions of Bones, in Hard Weather, are more difficult to Cure.

It hath beene noted, that the Tongue receiveth, more easily, Tokens of Diseases, than the other Parts; As of Heats within, which appeare most in the Blacknesse of the Tongue. Againe, Pied Castell are spotted in their Tongues, &c. The Cause is, (no doubt,) the Tendernesse of the Part, which thereby receiveth more easily all Alterations, than any other Parts of the Flesh.

When the Mouth is out of Taste, it maketh Things taste, sometimes Sal; Chiefly Bitter; And sometimes Loathsome; But never Sweet. The Cause is, the Corrupting of the Moisture about the Tongue; Which many times turneth Bitter, and Sal, and Loathsome; But Sweet never; For the rest are Degrees of Corruption.

It was observed in the Great Plague of the last Yeare, that there were scene, in divers Ditches, and low Grounds, about London, many Toads, that had Tails, two or three Inches long, at the least; Whereas Toads (usually) have no Tails at all. Which argueth a great Disposition to Putrefaction in the Soile and Aire. It is reported likewise, that Rootes, (such as Carrots, and Parsnips,) are more Sweet, and Lushious, in Infectious Yeares, than in other Yeares.

Wise Physicians should with all diligence inquire, what Simples Nature yeeldeth, that have extreme Subtile Parts, without any Mordacation, or Acrimony: For they undermine that which is Hard; They open that which is Stopped, and Shut; And they expell that which is Offensively gently, without too much Perturbation. Of this Kind are Elder-Flowers, which therefore are Proper for the Stone: Of this Kinde is the Dwarfse-Pine; which is Proper for the Jaundies: Of this Kinde is Hart's-Horne: which is Proper for Agues, and Infections: Of this Kinde is Piony, which is Proper for Stopplings in the Head: Of this Kinde is Fumitory, which is Proper for the Spleen: And a Number of others. Generally, divers Creatures bred of Putrefaction, though they be somewhat loathsome to take, are of this kinde; As Earth-wormes, Timber-Sowes, Snails, &c. And I conceive, that the Trochiscs of Vipers, (which are so much magnified,) and the Flesh of Snakes some wayes condited,

Experiment
Solitary, touch-
ing the
Resistance of
the Bones
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Experiment
Solitary, touch-
ing the
Tongue
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Experiment
Solitary, touch-
ing the
Tongue
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Experiment
Solitary, touch-
ing some
Properties
of Putrefaction
Seasons
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Experiment
Solitary, touch-
ing Speciall
Simples for
Medicines
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condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of Beasts *Purified*; (as *Castoreum*, and *Musk*, which have extreme *Subtile Parts*,) are to be placed amongst them. We see also that *Putrefaction* of Plants, (as *Agaricke*, and *Iemes-Eare*,) are of greatest Vertue. The Cause is, for that *Putrefaction* is the Subtilest of all *Motions*, in the *Parts* of Bodies: And since we cannot take downe the *Lives* of *Living Creatures*, (which some of the *Paracelsians* say (if they could bee taken downe,) would make us *Immortall*,) the Next is for *Subtiltie* of Operation, to take Bodies *Purified*; Such as may be safely taken.

Experiments
in Comfort,
touching
Venus.

693

IT hath beene observed by the *Ancients*, that Much Use of *Venus* doth Diminish the Sight; And yet *Eunuchs*, which are unable to generate are (nevertheless) also Diminished. The Cause of Diminution of Sight, in the Former, is the Expence of *Spirits*: In the Later, the Over-moisture of the Braine: For the Over-Moisture of the Braine doth thicken the *Spirits* Visually, and obstructeth their Passages; As we see by the Decay, in the Sight, in Age; Where also the Diminution of the *Spirits* concurrereth as another Cause: we see also that Blindnesse cometh by Rheumes, and Cataracts. Now in *Eunuchs*, there are all the Notes of Moisture; As the Swelling of their Thighes, the Loosenesse of their Belly, the Smoothnesse of their Skinne, &c.

694

The Pleasure in the Act of *Venus*, is the greatest of the Pleasures of the Senses; The Matching of it with *Itch* is improper, though that also be Pleasing to the touch. But the Causes are Profound. First, all the Organs of the Senses qualifie the Motions of the *Spirits*; And make so many Severall Species of Motions, and Pleasures or Displeasures thereupon, as there be Diversities of Organs. The Instruments of Sight, Hearing, Taste, and Smell, are of severall frame; And so are the Parts for Generation. Therefore *Scaliger* doth well, to make the Pleasure of Generation a Sixth Sense; And if there were any other differing Organs, & Qualified Perforations, for the *Spirits* to passe; there would be more than the Five Senses: Neither doe we well know, whether some Beasts and Birds, have not Senses that we know not; And the very *Sent* of Dogs is almost a Sense by it selfe. Secondly, the Pleasures of the Touch, are greater and deeper, than those of the other Senses; As we see in Warming upon Cold; Or Refrigeration upon Heat: For as the Paines of the Touch, are greater than the Offences of other Senses; So likewise are the Pleasures. It is true, that the Affecting of the *Spirits* immediately, and (as it were) without an Organ, is of the greatest Pleasure; Which is but in two things: Sweet Smells; And wine, and the like Sweet Vapours. For Smells, we see their great and sudden Effect in fetching Men againe, when they swoone: For Drinke, it is certaine, that the Pleasure of Drunkennesse, is next the Pleasure of Venus: And Great Joyes (likewise) make the *Spirits* move, and touch themselves: And the Pleasure of Venus is somewhat of the same Kinde.

695

It hath beene alwayes observed, that Men are more inclined to Venus in the Winter, and Women in the Summer. The Cause is, for that the *Spirits*, in a Body more Hot and Drie, (as the *Spirits* of Men are,) by the Summer are more exhaled, and dissipated; And in the Winter more condensed, and kept entire: But in Bodies that are Cold and Moist, (as Women are,) the Summer doth Cherish the *Spirits*, and calleth them forth; the Winter doth dull them. Furthermore, the Abstinence, or Intermission of the use of Venus, in Moist and well habituate Bodies, breedeth a Number of Diseases; And especially dangerous Impostumations. The Reason is evident; For that it is a Principall Evacuation, especially of the *Spirits*: For of the *Spirits*, there is scarce any Evacuation, but

but in Venus, and Exercise. And therefore the Omission of either of them, breedeth all Diseases of Repletion.

The Nature of *Vivification* is very worthy the Enquiry: And as the Nature of Things, is commonly better perceived, in Small, than in Great; and in unperfect, than in perfect; and in Parts, than in whole: So the Nature of *Vivification* is best enquired in Creatures bred of *Putrefaction*. The Contemplation whereof hath many Excellent Fruits. First, in Disclosing the Originall of *Vivification*. Secondly, in Disclosing the Originall of *Figuration*. Thirdly, in Disclosing many Things in the Nature of Perfect Creatures, which in them lie more hidden. And Fourthly, in Traducing, by way of Operation, some Observations in the Insecta, to work Effects upon Perfect Creatures. Note that the word *Insecta* agreeth not with the Matter, but we ever use it for Brevivities sake, intending by it Creatures bred of *Putrefaction*.

Experiments
in Comfort,
touching the
Insecta.

696

The *Insecta* are found to breed out of severall Matters: Some breed of Mud, or Dung; As the Earth-wormes, Eeles, Snakes, &c. For they are both *Putrefactions*: For Water in Mud doth Putrifie, as not able to Preserve it selfe: And for Dung, all Excrements are the Refuse and *Putrefactions* of Nourishment. Some breed in Wood, both Growing, and Cut downe. Quere in what Woods most, and at what Seasons? We see that the Wormes with many Feet, which round themselves into Balls, are bred chiefly under Logs of Timber, but not in the Timber; And they are said to bee found also, (many times,) in Gardens, where no Logs are. But it seemeth their Generation requireth a Coverture, both from Sunne, and Raine, or Dew; As the Timber is, And therefore they are not *Penomous*, but (contrariwise) are held by the Physicians to clarify the Blood. It is observed also that *Cimices* are found in the Holes of Bed-Sides. Some breed in the Haire of Living Creatures; As Lice, and Ticks; which are bred by the Sweat close kept, and somewhat acrid by the Haire. The Excrements of Living Creatures, doe not onely breed *Insecta*, when they are Excerned, but also while they are in the Body; As in Wormes whereto Children are most subject, and are chiefly in the Guts. And it hath beene lately observed by Physicians, that in many Pestilential Diseases, there are Wormes found in the upper Parts of the Body, where Excrements are not, but onely Humours Putrified. Fleas breed principally of Straw or Mats, where there hath beene a little Moisture, Or the Chamber and Bed-straw kept close, and not Aired. It is received that they are killed by Strewing Worme-wood in the Room. And it is truly observed, that Butter Things are apt, rather to kill, than engender *Putrefaction*; And they be Things that are Fat, or Sweet, that are aptest to Putrifie. There is a Worme, that breedeth in Meale, of the shape of a large white Maggot, which is given as a great dainty to Nightingales. The Moath breedeth upon Cloth, and other Lanifices; Especially if they be laid up dankish, and wet. It delighteth to be about the Flame of a Candle. There is a Worme called a *Weevil*, bred under Ground, and that feedeth upon Roots; As Parsnips, Carrets, &c. Some breed in Waters, especially shaded, but they must be Standing Waters; As the Water-Spider, that hath six Legs. The Flye called the Gad-flye, breedeth of somewhat that Swimmeth upon the Top of the Water, and is most about Ponds. There is a Worme that breedeth of the Dregs of

of Wine Decayed; which afterwards, (as is observed by some of the *Ancients*;) turneth into a *Gnat*. It hath beene observed by the *Ancients*, that there is a *Worme* that breedeth in old *Snow*, and is of Colour Reddish, and dull of Motion, and dyeth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; ~~For~~ Else it could hardly Vivifie. And the Reason of the Dying of the *Worme*, may be the sudden Exhaling of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benumbed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserved in *Cold*. It is affirmed both by the *Ancient* and *Moderne Observation*, that in *Furnaces* of Copper, and *Brasse*, where *Chalcites*, (which is *Vitrioll*;) is often cast in, to mend the working, there riseth suddenly a *Flie*, which sometimes moveth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene moving in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble Instance, and worthy to be weighed; for it sheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Living Creatures*, will Vivifie, if it have Matter Proportionable. Now the great *Axiome* of *Vivification* is, that there must bee *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; Matter *Viscous* or *Tenacious*, to hold in the *Spirit*; And that Matter to be put forth, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as ever it cooleth never so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we see in *Chymicall Trials*. Briefly, most *Things Purified* bring forth *Insecta* of severall Names; But wee will not take upon us now, to Enumerate them all.

697 The *Insecta* have been noted by the *Ancients*, to feed little: But this hath not beene diligently observed; For *Crasheppers* eat up the *Greene* of whole *Countries*; And *Silke-wormes* devoure *Leaves* swiftly; And *Ants* make great *Provision*. It is true, that *Creatures*, that Sleep and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* have Extreme *Varietie*, but the *Similar Parts* little. It is true, that they have, (some of them,) a *Diaphragme*, and an *Intestine*; And they have all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of long *Life*: Yet *Bees* have beene knowne to live seven yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to live till they be Old: And *Eeles*, which many times breed of *Purefaction*, will live and grow very long: And those that Enterchange from *Wormes* to *Flies* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, have been kept in *Boxes* foure yeares at the least. Yet there are certaine *Flies*, that are called *Ephemera*, that live but a day. The Cause is, the Exilitie of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might live longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*;) revive easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The Cause whereof is, the Diffusion of the *Vital Spirit*, and the easie dilating of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in *Pieces*; Which is caused also, for that their *Vital Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698 The *Insecta* have *Voluntarie Motion*, and therefore *Imagination*; And whereas some of the *Ancients* have said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently observed; For *Ants* goe right forwards

forwards to their *Hills*; And *Bees* doe (admirably) know the way, from a *Flowrie Heath*, two or three Miles off, to their *Hives*. It may be, *Gnats*, and *Flies*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have onely the *Sense* of *Feeling*; which is manifestly untrue; For if they goe forth right to a *Place*, they must needs have *Sight*: Besides, they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste*: And *Bees* are called with *Sound* upon *Brasse*, and therefore they have *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations concerning the *Insecta*, together with the Enumeration of them, we referre to that place, where we meane to handle the Title of *Animal's* in generall.

A Man Leapeth better with *Weights*, in his *Hands*, than without. The Cause is, for that the *Weight*, (if it bee proportionable,) strengtheneth the *Sinewes*, by Contracting them. For otherwise, where no *Contraction* is needfull, *Weight* hindreth. As we see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their *Raise*. *Quere*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were to breake forth with more Force: As *Breath* also drawne, and kept in, cometh forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater *Swing*, are first cast backward.

OF *Musical Tones*, and *Vnequall Sounds*, wee have spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Scratching Noise*; make a *Shivering* or *Horror* in the *Body*, and set the *Teeth* on edge. The Cause is, for that the *Objects* of the *Eare*, do affect the *Spirits* (immediately) most with *Leasure* and *Offence*. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There bee *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odious*, or *Fearfull*; But the same *Things Painted* do little affect. As for *Smells*, *Tastes*, and *Touchees*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a *Roundnesse* and *Equality*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Divers Sounds Meeting*. It is true, that *Inequality*, not Stayed upon, but *Passing*, is rather an Encrease of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucity* of a *Trumpet*; And in the *Nightingale-Pipe* of a *Regall*; And in a *Discord* straight falling upon a *Concord*: But if you stay upon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*, and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by divers Names, as *Scratching*, or *Graing*, such as wee now speake of. As for the *Setting* of the *Teeth* on *Edge*, we plainly see what an *Intercouse* there is, between the *Teeth*, and the *Organ* of the *Hearing*, by the *Taking* of the *End* of a *Bow*, between the *Teeth*, and *Striking* upon the *String*.

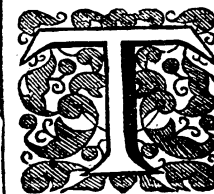
Experiment
Solitary, touching
Leaping.
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Experiment
Solitary, touching the
Pleasures, and
Displeasures of
the Senses,
especially of
Hearing.
700



NATVRALL HISTORIE.

VIII. Century.



Here be *Mineralls*, and *Fossiles*, in great Variety; But of *Veines* of Earib *Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Arminus*: Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing* of *Wounds*, *Stanching* of *Bloud*, *Stopping* of *Fluxes* and *Rheumes*, and *Arresting* the *Spreading* of *Poison*, *Infection*, and *Purefaction*: And they have of all other *Simples*, the *Perfected* and *Purest* *Qualitie* of *Drying*, with little or no *Mixture* of any other *Quality*. Yet it is true, that the *Bole-Arminick* is the most *Cold* of them; And that *Terra Lemnia* is the most *Hot*; For which Cause, the *Island Lemnos*, where it is digged, was in the Old *Fabulous* *Ages* consecrated to *Vulcan*.

About the *Bottome* of the *Straights* are gathered great *Quantities* of *Sponges*, which are gathered from the sides of *Rocks*, being as it were a large, but tough, *Masse*. It is the more to be noted, because that there bee but few *Substances*, *Plant-like*, that grow deep within the *Sea*; For they are gathered sometimes fifteen *Fathome* deepe; And when they are laid on *Shoare*, they seeme to be of great *Bulke*; But crushed together, will be transported in a very small *Roome*.

It seemeth, that *Fish*, that are used to the *Sali-water*, doe nevertheless delight more in *Fresh*. We see, that *Salmons*, and *Smelts* love to get into *Rivers*, though it be against the *Stream*. At the *Haven* of *Constantinople*, you shall have great *Quantities* of *Fish* that come from the *Euxine-Sea*; that when they come into the *Fresh water*, doe inebriate and turne up their *Bellies*, So as you may take them with your *Hand*. I doubt, there hath not beene sufficient Ex-

Experiment
Solitary, touch-
ing *Veines*
of *Medicinall*
Earth.

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Experiment
Solitary, touch-
ing the
Growth of
Sponges.

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Experiment
Solitary, touch-
ing *Sea-*
Fish put in
Fresh water.

703

periment made of Putting *Sea-Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Use, and Pleasure: For so you may have them new at some good distance from the *Sea*: And besides, it may bee, the *Fish* will eat the pleasure, and may fail to breed: And it is said that *Colch-ster Oysters*, which are put into *Pits*, where the *Sea* goeth and commeth, (but yet so, that there is a *Fresh Water* comming also to them, when the *Sea* voideth,) become by that means *Patter*, and more Grown.

Experiment
Solitary, touch-
ing Attraction by Si-
militude of
Substance.

704

The *Turkish Arrow* giveth a very Forceible *Shoot*; Inasmuch as it hath beene knowne, that the *Arrow* hath pierced a *Steele Target*, or a *Peece of Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a *Peece of Wood*, of eight Inches thicke. And it is certaine, that we had in use at one time for *Sea-Fight*, short *Arrows*, which they called *Sprighs*, without any other Heads, save *Wood* sharpened; which were discharged out of *Muskets*, and would pierce thorow the *Sides of Ships*, where a *Bullet* would not pierce. But this dependeth upon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude of Substance* will cause *Attraction*, where the *Body* is wholly freed from the *Motion of Gravity*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the help of the *Lead-Stone*. But this same *Motion of Weight* or *Gravitate*, (which is a meere *Motion of the Matter*, and hath no *Affinity* with the *Forme*, or *Kinde*,) doth kill the other *Motion*, except it selfe bee killed by a violent *Motion*; And in these *Instances of Arrows*; For then the *Motion of Attraction* by *Similitude of Substance*, beginneth to shew it selfe. But we shall handle this *Point of Nature* fully in due Place.

They have in *Turkey*, and the *East*, certaine *Confections*, which they call *Sauces*, which are liketo *Candied Conserve*; And are made of *Sugar* and *Lemons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other *Flowers*; And some Mixture of *Amber* for the more delicate *Persons*; And those they dissolve in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I doe much marvell, that no *Englishman*, or *Dutchman*, or *German*, doth set up *Brewing in Constantinople*; Considering they have such Quantity of *Barley*. For as for the generall Sort of *Men*, Frugality may be the Cause of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort might well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italy*, or *Spain*, have not taken into use, *Beere*, or *Ale*; Which (perhaps) if they did, would benefit both their *Healths*, and their *Complexions*. It is likely it would be *Matter of great Gain* to any, that should begin it in *Turkey*.

Experiments
in Comfort
touching
Sweat.

706

In *Swimming in Hot Water*, *Sweat* (nevertheless) commeth not in the *Parts* under the *Water*. The Cause is, First, for that *Sweat* is a *Kinde of Colligation*. And that *Kinde of Colligation* is not made, either by an *Over-Drye Heat*, or an *Over-Moist Heat*. For *Over-Moisture* doth somewhat extinguish the *Heat*; As we see, that even *Hot Water* quenchech *Fire*: And *Over-Drye Heat* smothereth the *Pores*: And therefore *Men* will sooner *Sweat* covered beneath the *Snow*, or *Fire*, than if they stood naked; And *Earthen Botles*, filled with *Hot Water*, doe provoke, in *Bed*, a *Sweat* more daintily, than *Brick-Bars*. Secondly, *Hot Water* doth cause *Evaporation* from the *Skin*; So as it is much the *Warmer*, in those *Parts* under the *Water*, before it issueth in *Sweat*.

Sweat. Again, *Sweat* commeth more plentifully, if the *Heat* bee increased by *Degrees*, than if it be greatest at first, or equall. The Cause is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physicians* may doe well, when they provoke *Sweat* in *Bed*, by *Botles*, with a *Decoction* of *Sudorifick Herbs* in *Hot Water*, to make two *Degrees of Heat* in the *Botles*; And to lay in the *Bed*, the lesse Heated first, and after halfe an *Houre* the more Heated.

Sweat is *Salt* in Taste; The Cause is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is onely that *Part*, which is *Separate*, and *Externed*: *Bloud* also *Raw*, hath some *Saltiness*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtil *Excretion* from the *Bloud*.

Sweat commeth forth more out of the *Upper Parts* of the *Body*, than the *Lower*; The Reason is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Drye*; As the *Forehead*, and *Breast*.

Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleepe* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosensse* of the *Body*, &c. The Cause is, for that in *Sleepe*, the *Heat*, and *Spirits* doe naturally move inwards, and therewith. But when they are collected once within, the *Heat* becometh more *Violent*, and *Irritate*; And thereby expelleth *Sweat*.

Cold Sweats are (many times) *Mortall*, and neare *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriackall Passions*, &c. The Cause is, for that *Cold Sweats* come by a *Relaxation* or *Forsaking* of the *Spirits*, whereby the *Moisture* of the *Body*, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out.

In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is *ill*, and rather to bee stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lighteneth; As in *Agues*, *Pestilence*, &c. The Cause is, for that *Sweat* in the *Latter Sort* is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the *Former*, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them *Oppressed*; Or from *Motion of Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*.

The *Nature* of the *Glo-worme* is hitherto not well observed. Thus much we see; That they breed chiefly in the *Hottest Months* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heat*: And againe, that by reason of the *Finenesse*, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Flie* they call *Lucciole*, that shineth as the *Glo-worme*, doth; And it may be the *Flying Glo-worme*. But that *Flie* is chiefly upon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Grease* of the *Fens*, give as good *Shade*, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so far as to be *Winged*.

The *Passions* of the *Minde*, worke upon the *Body*, the *Impressions* following. *Fear* causeth *Paleness*; *Trembling*; The *Standing* of the *Haire* upright;

Experiment
Solitary, touch-
ing the
Glo-worme.

712

Experiments
in Comfort,
touching the
Impressions,
which the
Passions of the
Minde make
upon the
Body.

713

right; Starting; and Scratching. The Paleness is caused, for that the Blood runneth inward, to succour the Heart. The Trembling is caused, for that through the Flight of the Spirit inward, the Outward Parts are destituted, and not sustained. Standing upright of the Haire is caused, for that by Shutting of the Pores of the Skin, the Haire that lyeth asloape, must needs Rise. Starting is both an Apprehension of the Thing feared; (And, in that kinde, it is a Motion of Shrinking;) And likewise an Inquisition, in the beginning, what the Matter should be; (And in that kinde it is a Motion of Erection;) And therefore, when a Man would listen suddenly to any Thing, he Starteth; For the Starting is an Erection of the Spirit to attend. Scratching is an Appetite of Expelling that which suddenly striketh the Spirit: For it must bee noted, that many Motions, though they bee unprofitable to expell that which hurteth, yet they are Offers of Nature, and cause Motions by Consent; As in Groaning, or Crying upon Paine.

714

Griefe, and Paine cause Sighing; Sobbing; Groaning; Screaming; and Roaring; Teares; Distorting of the Face; Grinding of the Teeth; Sweating. Sighing is caused by the Drawing in of a greater Quantity of Breath to refresh the Heart that laboureth: like a great Draught when one is thirsty. Sobbing is the same Thing stronger. Groaning, and Screaming, and Roaring, are caused by an Appetite of Expulsion, as hath beene said: For when the Spirit cannot expell the Thing that hurteth, in their Strife to doe it, by Motion of Consent, they expell the Voice. And this is, when the Spirit yeeld, and give over to resist; For if one doe constantly resist Paine, he will not groane. Teares are caused by a Contraction of the Spirit of the Braine; Which Contraction by consequence astringeth the Moisture of the Braine, and thereby sendeth Teares into the Eyes. And this Contraction, or Compression causeth also Wringing of the Hands; For wringing is a Gesture of Expression of Moisture. The Distorting of the Face is caused by a Comemion, first to beare and resist, and then to expell; Which maketh the Parts knit first, and afterwards open. Grinding of the Teeth is caused (likewise) by a Gathering and Serring of the Spirit together to resist; Which maketh the Teeth also to set hard one against another. Sweating is also a Compound Motion by the Labour of the Spirit, first to resist, and then to expell.

715

Joy causeth a Chearefulness and Vigour in the Eyes; Singing; Leaping; Dancing; And sometimes Teares. All these are the effects of the Dilatation, and Comming forth of the Spirit into the Outward Parts; Which maketh them more Lively, and Stirring. We know it hath beene scene, that Excessive sudden Joy hath caused Present Death, while the Spirit did spread so much, as they could not retire againe. As for Teares, they are the Effects of Compression of the Moisture of the Braine, upon Dilatation of the Spirit. For Compression of the Spirit worketh an Expression of the Moisture of the Braine, by Consent, as hath beene said in Griefe. But then in Joy, it worketh it diversly; viz. by Propulsion of the Moisture, when the Spirit dilate, and occupie more Roome.

716

Anger causeth Paleness in some, and the Going and Comming of the Colour in Others: Also Trembling in some, Swelling, Foaming at the Mouth; Stamping; Bending of the Fist. Paleness, and Going, and Comming of the Colour, are caused by the Burning of the Spirit about the Heart; Which to refresh themselves, call in more Spirit from the Outward Parts. And if the Paleness be alone, without Sending forth the Colour againe, it is commonly joyned with some Feare; But in many there is no Paleness at all, but contrariwise Redness about the Cheeke, and Gills; Which is by the Sending forth of the Spirit

Spirit in an Appetite to Revenge. Trembling in Anger is likewise by a Calling in of the Spirit; And is commonly, when Anger is joyned with Feare. Swelling is caused, both by a Dilatation of the Spirit by Over-Heating, and by a Liquefaction or Boiling of the Humours thereupon. Foaming at the Mouth is from the same Cause, being an Ebullition, Stamping, and Bending of the Fist, are caused by an Imagination of the Act of Revenge.

Light Displeasure or Dislike, causeth Shaking of the Head; Frowning, and Knitting of the Browes. These Effects arise from the same Causes that Trembling, and Horrour doe; Namely, from the Retiring of the Spirit, but in a lesse degree. For the Shaking of the Head is but a Slow and Definite Trembling; And is a Gesture of slight Refusal: And we see also, that a Dislike causeth (often) that Gesture of the Hand, which we use, when we refuse a Thing, or warne it away. The Frowning and Knitting of the Browes, is a Gathering, or Serring of the Spirit, to resist in some Measure. And we see also, this Knitting of the Browes will follow upon earnest Studying, or Cogitation of any Thing, though it be without Dislike.

717

Shame causeth Blushing; And Casting Downe of the Eyes. Blushing is the Resort of Blood to the Face; Which in the Passion of Shame, is the Part that laboureth most. And although the Blushing will be seen in the whole Breast, if it be Naked, yet that is but in Passage to the Face. As for the Casting downe of the Eyes, it proceedeth of the Reverence a Man beareth to other Men; Whereby, when he is ashamed, he cannot endure to looke firmly upon Others: And we see, that Blushing, and the Casting downe of the Eyes both, are more when wee come before Many; *Ore Pompeii quid Mollus?* *Nunquam non coram pluribus erubuit:* And likewise when we come before Great, or Reverend Persons.

718

Pitie causeth sometimes Teares; And a Flexion or Cast of the Eye aside. Teares come from the same Cause that they doe in Griefe: for Pitie is but Griefe in Another's Behalfe. The Cast of the Eye is a Gesture of Aversion, or Loibnesse to behold the Object of Pitie.

719

Wonder causeth Astonishment, or an Immoveable Posture of the Body; Casting up of the Eyes to Heaven; And Lifting up of the Hands. For Astonishment, it is caused by the Fixing of the Minde upon one Object of Cogitation, whereby it doth not spaiate and transurre, as it useth: For in Wonder the Spirit stie not, as in Feare; But onely settle, and are made lesse apt to move. As for the Casting up of the Eyes, and Lifting up of the Hands, it is a Kinde of Appeal to the Deity; Which is the Authour, by Power, and Providence, of Strange Wonders.

720

Laughing causeth a Dilatation of the Mouth, and Lips; A Continued Expulsion of the Breath, with the loud Noise, which maketh the Interjection of Laughing; Shaking of the Breast, and Sides; Running of the Eyes with Water, if it be Violent, and Continued. Wherein first it is to be understood, that Laughing is scarce (properly) a Passion, but hath his Source from the Intellect; For in Laughing there ever precedeth a Conceit of somewhat Ridiculous. And therefore it is Proper to Man. Secondly, that the Cause of Laughing is but a Light Touch of the Spirit, and not so deepe an Impression as in other Passions. And therefore, (that which hath no Affinitie with the Passions of the Minde,) it is moved, and that in great vehemency, onely by Tickling some Parts of the Body: And we see that Men even in a Grieved State of Minde, yet cannot sometimes forbear Laughing. Thirdly, it is ever joyned with some Degree of Delight: And therefore Exhilaration hath some Affinitie with Joy, though it be a much Lighter Motion: *Res severa est verum Gaudium.*

721

dium. Fourthly, that the *Object* of it is *Deformitie*, *Absurditie*, *Shrewd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these *Generall Noies* give some *Light*. For the *Dilation* of the *Mouth* and *Lips*; *Continued Expulsion* of the *Breath* and *Voice*; and *Shaking* of the *Breast* and *Sides*; they proceed (all) from the *Dilation* of the *Spirits*; Especially being *Sudden*. So likewise, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where wee spake of the *Tears* of *Ioy* and *Griefe*;) is an *Effect* of *Dilation* of the *Spirits*. And for *Suddenesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrewd Turne* that lighteth upon *Another*; Or any *Deformity*, &c. moveth *Laughter* in the *Instant*; Which after a little time it doth not. So we cannot *Laugh* at any thing after it is *Stale*, but whilest it is *New*: And even in *Tickling*, if you *Tickle* the *Sides*, and give warning; Or give a *Hard* or *Continued Touch*, it doth not move *Laughter* so much.

722

Lust causeth a *Frangency* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the Things desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (for that great Use may be made of the *Observation*;) that (evermore) the *Spirits*, in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath been mentioned, resort to the *Eyes*; and *Venerous Parts*: In *Feare*, and *Anger*, to the *Face*; and in *Ligh* Dislikes to the *Head*.

Experimente
in Confort,
touching
Drunkennesse.

723

724

It hath been observed by the *Anciens*, and is yet beleevd, that the *Sperme* of *Drunk Men* is *Unfruitfull*. The *Cause* is, for that it is *Over-moistened*, and wanteth *Spissitude*. And wee have a merry Saying, that they that goe *Drunk* to *Bed*, get *Daughters*.

Drunk Men are taken with a plaine *Defect*, or *Destitution* in *Voluntary Motion*. They *Reele*; They *tremble*; They cannot stand, nor speak strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate *Part* of the *Place*, where they are; And so make them *Weake* to move. And therefore, *Drunk Men* are apt to fall asleep: And *Opiumes*, and *Simples*, (as *Poppy*, *Henbane*, *Hellbloom*, &c.) induce a kinde of *Drunkennesse*, by the *Grossnesse* of their *Vapour*; As *Wine* doth by the *Quantity* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey upon it, as well as they: And so they make the *Spirits* lesse *Supple*, and *Apt* to move.

725

15

Drunk Men imagine every *Thing* turneth *round*; They imagine also that *Things* come upon them; They see not well *Things* a farre off; Those *Things* that they see neere *Hand*, they see out of their *Place*; And (sometimes) they see *Things* double. The *Cause* of the *Imagination* that *Things* turne *Round*, is, for that the *Spirits* themselves turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* upon *Compression*, turneth, as we see in *Water*;) And it is all one to the *Sight*, whether the *Visuall Spirits* move, or the *Object* moveth, or the *Medium* moveth. And we see that long *Turning Round* breedeth the same *Imagination*. The *Cause* of the *Imagination* that *Things* come upon them, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Object* seeme to come on; And besides, when they see *Things* turne *Round*, and *Move*, *Feare* maketh them think they come upon them. The *Cause* that they cannot see *Things* a farre off, is the *weaknesse* of the *Spirits*; for in every *Migrain*, or *Vertigo*, there is an *Obscuration* joynd with a *Simblance* of *Turning Round*; Which we see also in the lighter Sort of *Swoonings*.

The *Cause* of Seeing things out of their *Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Unequall Medium*; And it is, as the *Sight* of *Things*, out of *place*, in *Water*. The *Cause* of Seeing *Things* double, is, the *Swift* and *Unequall Motion* of the *Spirits*, (being *Oppressed*;) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Object*, make the same *Appearances*; And for the *Swift Motion* of the *Object*, wee see, that if you fillip a *Lute-String*, it sheweth double, or *Treble*.

Men are sooner *Drunk* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The *Cause* of the *Former* is, for that the *Wine* descendeth not so fast to the *Bottom* or the *Stomach*; But maketh longer *Stay* in the *Upper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same *Reason*, *Sops* in *Wine*, (*Quantity* for *Quantity*;) inebriate more, than *Wine* of it selfe. The *Cause* of the *Latter* is, for that the *Sugar* doth inspissate the *Spirits* of the *Wine*, and maketh them not so easie to resolve into *Vapour*. Nay further, it is thought, to be some *Remedy* against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same *Effect* is wrought either by *Oyle*, or *Milke*, taken upon much *Drinking*.

726

The Use of *Wine*, in *Drie*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Fall Bodies*, it is good. The *Cause* is, for that the *Spirits* of the *Wine* doe prey upon the *Dew*, or *Radical Moisture*, (as they terme it,) of the *Body*, and so deceive the *Animall Spirits*. But where there is *Moisture* Enough, or *Superfluous*, there *Wine* helpeth to digest, and desiccate the *Moisture*.

Experimente
Solitary, touch-
ing the
Help or Hurt
of Wine,
though Mode-
rately used.

727

Experiment
Solitary, touch-
ing Cater-
pillers.

728

The *Caterpillar* is one of the most *Generall* of *Wormes*, and breedeth of *Dew*, & *Leaves*. For wee see infinite Number of *Caterpillers*, which breed upon *Trees*, and *Hedges*; By which the *Leaves* of the *Trees*, or *Hedges*, are in great *Part* consumed; As well by their *Breeding* out of the *Leafe*, as by their *Feeding* upon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East Winds* have much blowne: The *Cause* whereof is, the *Driness* of that *Wind*: For to all *Vivification* upon *Putrefaction*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they have *Copwells* about them, which is a signe of a *Slimy Driness*: As wee see upon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwells* breed all over. Wee see also the *Greene Caterpillar* breedeth in the *Inward Parts* of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Caterpillers*, both the greatest, and the most, breed upon *Cabbages*, which have a *Fat Leafe*, and apt to *Putrifie*. The *Caterpillar* towards the *End* of *Summer* waxeth *Voluble*, and turneth to a *Butterfly*, or perhaps, some other *Fly*. There is a *Caterpillar*, that hath a *Furrow*, or *Downe* upon him, and seemeth to have *Affinitie* with the *Silke-worme*.

The *Flies Cantharides* are bred of a *Worme*, or *Caterpillar*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosive*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Absterfice*: The *Fruit* of the *Briar* is said to make *Children*, or those that *Eat* them, *Scabbed*. And therefore, no marvell though *Cantharides* have such a *Corrosive*, and *Cauterizing Quality*; For there is not one other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be,

Experiment
Solitary, touch-
ing the *Flies*
Cantharides.

729

be, that the delicate-coloured *Dragon-Flies*, may have likewise some *Corrosive Qualitie*.

Experiments
in Comfort,
touching
Lassitude.

730

Lassitude is remedied by *Bathing*, or *Anointing* with *Oyle*, and *Warmer Water*. The Cause is, for that all Lassitude is a kinde of *Confusion*, and *Compression* of the *Parts*; And *Bathing*, and *Anointing* give a *Relaxation*, or *Emollium*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge Lassitude. The Reason whereof is, partly, because by *Chearing* or *Comforting* of the *Spirits*, it openeth the *Parts* *Compressed*, or *Confused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so discharge *Wearinesse*; as *Sleepe* likewise doth.

731

In *Going up a Hill*, the *Knees* will be most *weary*; In *Going downe a Hill*, the *Thighes*. The Cause is, for that in the *Lift* of the *Feet*, when a Man *Goeeth up the Hill*, the *Weight* of the *Body* beareth most upon the *Knees*; And in *Going downe the Hill*, upon the *Thighes*.

Experiment
Solitary, tou-
ching the
Casting of the
Skin, and
Shell in some
Creatures.

732

The *Casting* of the *Skin*, is by the *Anciens* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Casting* of the *Skin* a *New Birth*: And besides, the *Secundine* is but a generall *Cover*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grasshopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crayfish*, the *Hodmandod* or *Dodman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* never: So as it is like, they *scale off*, and *crumble away* by degrees. And they are knowne, by the *Extremee Tendernes* and *Softnes* of the *New Shell*; And somewhat by the *Freshe* of the *Colour* of it. The Cause of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin* or *Shell*; And againe, the *Loosenesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds* that have much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments
in Comfort,
touching the
Postures of the
Body.

733

Lying, not *Erect*, but *Hollow*, which is in the *Making* of the *Bed*; Or with the *Legs* gathered up, which is in the *Posture* of the *Body*, is the more *Wholesome*. The Reason is, the better *Comforting* of the *Stomach*, which is by: that lesse *Penfile*: And we see, that in *Weake Stomachs*, the *Laying* up of the *Legs* high, and the *Knees* almost to the *Mouth*, helpeth, and comforteth. We see also that *Gally-Slaves*, notwithstanding their *Miserie* otherwise, are commonly *Fat* and *Flethy*; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is *Penfile* in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and *Belly*; As in *Rowing*, and in *Sailing*, being *Seer*.

734

Aggrav and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The Cause is, for that the *Vapours*, which were gathered by *Sitting*, by the *Sudden Motion*, flie more up into the *Head*.

735

Laying long upon any *Part* maketh it *Numme*, and, as we call it, *Asleepe*.
The

The Cause is, for that the *Compression* of the *Part* suffereth not the *Spirits* to have free *Accesse*; And therefore when we come out of it, wee feelee a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

It hath beene noted, that those *Yeares* are *Pestilentiall*, and *Unwholesome*, when there are great *Numbers* of *Frogs*, *Flies*, *Locusts*, &c. The Cause is plaine; For that those *Creatures* being engendred of *Purification*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Purification*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you find *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

It is an *Observation* amongst *Country-People*, that *Yeares* of *Store* of *Hawes* and *Heps*, doe commonly portend *Cold winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth even to the *Falling* of a *Sparrow*; And much more is like to reach to the *Preservation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leave great *Quantity* of *Cold Vapours*; not dissipate; Which causeth the *Cold* of the *winter* following.

They have in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as *Blacke* as *Soot*, and of a *Strong Sene*, but not *Aromaticall*; Which they take, beaten into *Powder*, in *Water*, as *Hot* as they can drinke it: And they take it, and sit at it in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Brain*, and *Heart*, and helpeth *Digestion*. Certainly this *Berry-Coffa*; The *Root*, and *Leafe* *Benell*; The *Leafe Tobacco*; And the *Tear* of *Poppy*, (*Opium*), of which the *Turkes* are great *Takers*, (supposing it expelleth all *Fears*;) doe all *Condense* the *Spirits*, and make them *Strong*, and *Aleger*. But it seemeth they are taken after severall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoke*; And *Benell* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quere* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, *Root*, and *Flower*; Of *Fulium Indum*; Of *Amber-grice*; Of the *Affyrrian Amomum*, if it may bee had; And of the *Scarlet Powder*, which they call *Kermes*; And (generally) of all such *Things*, as doe inebriate and provoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible ever than *Leaves*.

The *Turkes* have a *Blacke Powder*, made of a *Minerall* called *Alcobole*; Which with a fine long *Pencil* they lay under their *Eye-Lids*; Which doth colour them *Blacke*; Whereby the *White* of the *Eye* is set off more *White*. With the same *Powder* they colour also the *Haires* of their *Eye Lids*, and of their *Eye-browes*, which they draw into *Embowed Arches*. You shall finde that *Xenophon* maketh *Mention*, that the *Medes* used to paint their *Eyes*. The *Turkes* use with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* *Blacke*: And divers with us, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* *black*, by *Combing* it, (as they say,) with a *Leaden Combe*, or the like. As for the *Chineses*, who are of an ill *Complexion*, (being *Olivaster*;) they paint their *Cheekes* *Scarlet*; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe *Naked*,

Experiment
Solitary, tou-
ching Pesti-
lentiall Yeares.
736

Experiment
Solitary, tou-
ching the
Prognosticks of
Hard winters.
737

Experiment
Solitary, tou-
ching Medi-
cines that
Condense, and
Relieve the
Spirits.
738

Experiment
Solitary, tou-
ching Pain-
tings of the
Body.
739

Naked, doe not onely paint Themselves, but they pownee and raze their Skinne, that the *Paining* may not be taken forth; And make it into Works. So doe the *West Indians*; And so did the Ancient *Pis*, and *Brittons*; So that it seemeth, *Men* would have the Colours of *Birds Feathers*, if they could tell how; Or at least, they will have *Gay Skins*, in stead of *Gay Cloathes*.

Experiment
Solitary, touch-
ing the Use
of Bathing and
Anointing.

740

IT is strange, that the use of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and the *Grecians*, it was as usuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with us it remaineth but as a Part of *Physicke*. I am of Opinion, that the Use of it, as it was with the *Romans*, was hurtfull to Health: For that it made the Body Soft, and easieto Waste. For the *Turkes* it is more proper, because of their *Drinking Water*, and *Feeding* upon *Rize*, and other Food of small Nourishment, maketh their Bodies so Solide, and Hard, as you need not feare that *Bathing* should make them *Froashy*. Besides, the *Turkes* are great *Sitters*, and seldome walke; Whereby they Sweat lesse, and need *Bathing* more: But yet certain it is, that *Bathing*, and especially *Anointing*, may be to use, as it may be a great Help to Health, and *Prolongation of Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment
Solitary touch-
ing Chamol-
etting of
Paper.

741

THe *Turks* have a Pretty Art of *Chamoletting of Paper*, which is not with us in use. They take divers Oyled Colours, and put them severally (in drops) upon *Water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some Thickness,) with it; And the *Paper* will bee Waved, and Veined, like *Chamolet*, or *Marble*.

Experiment
Solitary, touch-
ing Cattle-
Inte.

742

IT is somewhat strange, that the *Bloud* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and onely the *Bloud* of the *Cuttle* should bee as *Blacke as Inke*. A Man would thinke, that the Cause should be the *High Concoction* of that *Bloud*; For we see in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment
Solitary, touch-
ing Enticase
of weight in
Earth.

743

IT is reported of *Credit*, that if you take *Earth*, from Land adjoining to the *River of Nile*, And preserve it in that manner, that it neither come to be Wet, nor Wasted; And Weigh it daily, it will not alter *Weight* untill the seventeenth of *June*, which is the Day when the *River* beginneth to rise; And then it will grow more and more *Ponderous* till the *River* commeth to his Height. Which if it be true, it cannot bee caused, but by the *Aire*, which then beginneth to Condense; And so turneth within that Small *Mould* into a degree of *Moisture*; Which produceth *weight*. So it hath bene observed, that *Tobacco*, Cut, and Weighed, and then Dried by the *Fire*, loseth *Weight*; and after being laid in the open *Aire*, recovereth *Weight* againe. And it should seeme, that as soone as ever the *River* beginneth to increase, the whole *Bodies* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that upon that very Day, when the *River* first riseth, great *Plagues*, in *Cairo*, use suddenly to break up.

Experiments
in Confort,
touching
Sleep.

744

THose that are very Cold, and especially in their Feet, cannot get to *Sleepe*. The Cause may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth stop in, and hinder: For we see, that in great *Cold*, one can scarce draw

draw his *Breath*. Another Cause may be, for that *Cold* calleth the *Spirits* to succour; And therefore they cannot so well close, and goe together in the *Head*; which is ever requisite to *Sleepe*. And for the same Cause, *Paine*, and *Noise* hinder *Sleepe*; And *Darknesse* (contrariwise) furthereth *Sleepe*.

Some *Noises* (whereof wee spake in the 112. Experiment) help *Sleepe*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The Cause is, for that they move in the *Spirits* a gentle *Attention*; And whatsoever moveth *Attention*, without too much Labour, stillet the *Naturall* and discursive *Motion* of the *Spirits*.

Sleepe nourisheth, or at least preserveth *Bodies*, a long time, without other *Nourishment*. *Beasts* that sleep in *Winter*, (as it is noted of *Wilde Beares*), during their *Sleepe* wax very Fat, though they Eat nothing. *Bats* have bin found in *Ovens*, and other Hollow Close Places, Matted one upon another; And therefore it is likely that they *Sleepe* in the *Winter* time, and eat Nothing. *Quare*, whether *Bees* doe not *Sleepe* all *Winter*, and save their *Honey*? *Butterflies*, and other *Flies*, doe not onely *sleep*, but lie as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, revive againe. A *Dormouse*, both *Winter* and *Summer*, will *Sleep* some dayes together, and eat Nothing.

To restore *Teeth* in *Age*, were *Magnale Naturæ*. It may bee thought of. But howsoever, the *Nature* of the *Teeth* deserveth to be inquired of, as well as the other *Parts* of *Living Creatures Bodies*.

THere be Five *Parts* in the *Bodies* of *Living-Creatures*, that are of *Hard Substance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; and the *Nails*. The greatest *Quantity* of *Hard Substance* Continued, is towards the *Head*. Forthere is the *Skull* of one Entire *Bone*; There are the *Teeth*; There are the *Maxillary Bones*; There is the *Hard Bone*, that is the *Instrument* of *Hearing*; And thence issue the *Hornes*: So that the *Building* of *Living Creatures Bodies*, is like the *Building* of a *Timber-House*, where the *Walls*, and other *Parts* have *Columns*, and *Beames*; But the *Roofe* is, in the Better Sort of *Houses*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they have Three other *Hard Substances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* have *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Nail*. But no *Living-Creatures*, that have *Shells* very hard; (As *Oysters*, *Cocles*, *Mussels*, *Scallops*, *Crabs*, *Lobsters*, *Cra-fish*, *Shrimps*, and especially the *Tortoise*;) have *Bones* within them, but onely little *Gristles*.

Bones, after full Growth, continue at a Stay: And so doth the *Skull*: *Hornes*, in some *Creatures*, are cast, and renewed: *Teeth* stand at a Stay, except their *Wearing*: As for *Nails*, they grow continually: And *Bills* and *Beakes* will over-grow, and sometimes be cast; As in *Eagles*, and *Parrots*.

Most of the *Hard Substances* flie to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nails*, and *Beakes*: Onely the *Bones* are more *Inward*, and clad with *Flesh*. As for the *Entrails*, they are all without *Bones*; Save that a *Bone* is (sometimes) found in the *Heart* of a *Stag*; And it may bee in some other *Creature*.

The *Skull* hath *Braine*, as a kinde of *Marrow*, within it. The *Backe-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* have another. The *Lam-Bones* have no *Marrow* Severed, but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to have

Experiments
in Confort,
touching
Teeth and
Hard Substances
in the Bodies
of Living
Creatures.

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have a kinde of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Bloud*. *Horne* is alike throughout; And so is the *Nail*.

751 None other of the *Hard Substances* have *Sense*, but the *Teeth*: And, the *Teeth* have *Sense*, not onely of *Paine*, but of *Cold*.

But we will leave the Enquiries of other *Hard Substances*, unto their severall *Places*; And now enquire onely of the *Teeth*.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharp*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betwene both. But there have beene some *Men*, that have had their *Teeth* undivided, as of one whole *Bone*, with some little *Marke* in the *Place* of the *Division*; As *Pyrrhus* had. Some *Creatures* have *Over-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tusks*; As *Boares*, *Pikes*, *Salmons*, and *Dogs*, though lesse. Some *Living Creatures* have *Teeth* against *Teeth*; As *Men*, and *Horses*; And some have *Teeth*, especially their *Master-Teeth*, indented one within another, like *Sawes*; As *Lions*; And so againe have *Dogs*. Some *Fishes* have divers *Rowes* of *Teeth* in the *Roofes* of their *Mouthes*; As *Pikes*, *Salmonds*, *Trouts*, &c. And many more in *Salu-waters*. *Snakes*, and other *Serpents* have *Venomous Teeth*; Which are sometimes mistaken for their *Sting*.

753 No *Beast* that hath *Hornes*, hath *Vpper Teeth*; And no *Beast*, that hath *Teeth* above, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet e converso; For *Dogs*, that have no *Hornes*, have no *Vpper Teeth*.

754 *Horses* have, at three yeares old, a *Tooth* put forth, which they call the *Colts Tooth*; And at foure yeares old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, every yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; That the *Marke* is out of the *Horses Mouth*.

755 The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seven yeares old. But divers have *Backward-Teeth* come forth at *Twenty*, yea some at *Thirty*, and *Forty*. *Quere* of the manner of the *Comming* of them forth. They tell a *Tale* of the old *Counesse* of *Desmond*, who lived till she was *sevenscore*-yeares old, that she did *Denire* twice, or thrice; Casting her old *Teeth*, and others *Comming* in their *Place*.

756 *Teeth* are much hurt by *Sweete Meats*; And by *Painting* with *Mercury*; And by *Things Over-hot*; And by *Things Over-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

757 Concerning *Teeth*, these *Things* are to bee Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Slaying* and *Easing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have beene stricken out. 6. And last of all, that *Great One*, of *Restoring Teeth* in *Age*. The *Instances* that give any *likelihood* of *Restoring Teeth* in *Age*, are, The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are *Commateriall* with *Teeth*. *Quere* therefore more particularly how that commeth. And againe, the *Remouing* of *Hornes*. But yet that hath not beene knowne to have beene provoked by *Art*; Therefore let *Triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they

they may be procured to come *Larger* than usuall; As to make an *One*, or a *Deere*, have a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may bee brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and provoked. It may bee tried also, whether *Birds* may not have something done to them when they are *Young*, whereby they may bee made to have *Greater*, or *Longer Bills*; Or *Greater*, and *Longer Tallons*? And whether *Children* may not have some *Wash*, or some thing to make their *Teeth* *Better*, and *Stronger*? *Corall* is in use as an *Help* to the *Teeth* of *Children*.

SOME *Living Creatures* *Generate* but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheep*, *Wilde Coneyes*, &c. And most *Sorts* of *Birds*, and *Fishes*: Others at any time of the *Yeare*, as *Men*; And all *Domestick Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The *Cause* of *Generation* at all *Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse*, ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all *Seasons*, are full of *Heat*, and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Drie Creature*, as appeareth by their *Fearfulness*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildenesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a *drie Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the *Time* of *Going to Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Earely about the *Middle* of *September*, they goe to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheep*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at certaine *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat* and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of *Generation*: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest she is busie in *Sitting*, or *Rearing* her *Young*. And therefore it is found by *Experience*, that if you take the *Eggs*, or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate againe, three or foure times, one after another.

Of *Living Creatures*, some are longer time in the *Womb*, and some shorter. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about sixe *Moneths*; *Dogs* goe about nine *Moneths*; *Mares* eleven *Moneths*; *Butches* nine *Weekes*; *Elephants* are said to goe two *Yeares*; For the *Received Tradition* of ten *Yeares* is *Fabulous*. For *Birds* there is double Enquiry; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Eggs*; And againe, betweene the *Eggs Layed*, and the *Disclusing* or *Hatching*. And amongst *Birds* there is lesse *Diversity* of *Time*, than amongst other *Creatures*, yet some there is: For the *Hen* sitteth but three *Weekes*; The *Turkey-Hen*, *Goose*, and *Duck*, a *Moneth*: *Quere* of others. The *Cause* is of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*, Or

Experiments in Confort, touching the Generation and Bearing of Living Creatures in the Wombe.

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Or from the Constitution of the *Womb*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *Womb*; As is chiefly scene in *Men*; And so *Elephants* which are long in the *Womb*, are long time in *Comming* to their full *Growth*. But in most other *Kindes*, the Constitution of the *Womb*, (that is, the *Hardnesse*, or *Driness* thereof,) is concurrent with the former *Cause*. For the *Calf* hath about foure yeares of *Growth*; And so the *Fawne*; And so the *Calf*. But *Whelps*, which come to their *Growth* (commonly) within three *Quarters* of a yeare, are but nine *Weekes* in the *Womb*. As for *Birds*, as there is lesse *Diversitie*, amongst them in the time of their *Bringing forth*; So there is lesse *Diversitie* in the time of their *Growth*; Most of them comming to their *Growth* within a *Twelve-Moneth*.

760

Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *Women*, *Lionesses*, &c. This may be caused, either by the *Quantity* of *Sperme* required to the *Producing* One of that *Kinde*; which if lesse be required, may admit greater *Number*; If more, fewer: Or by the *Partitions* and *Cells* of the *Womb*, which may sever the *Sperme*.

Experiments
in Confort
touching
Species Visible.

761

There is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottom* of the *Water*, will shew greater; So will a *Candle* in a *Lantheorne*, in the *Bottom* of the *Water*. I have heard of a *Practise*, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* Diveth, having his *Eyes* open, and swimmeth upon his *Back*, whether (I say) he seeth *Things* in the *Aire*, greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

762

It would be well boulded out, whether great *Refractions* may not be made upon *Reflexions*, as well as upon *Direct Beames*. For Example, Wee see, that take an *Empty Basin*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Basin*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basin* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Basin* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beautie*, and *Strangenesse*, were a fine *Prooffe*: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cistern* or *Poole* of *Water*, you shall place over against it a *Picture* of the *Devill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Devills Picture* aside, not seeing the *Water*, it will looke like a *Devill* indeed. They have an old tale in *Oxford*, that *Frisar Bacon* walked betwene two *Steeles*: Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

Experiments
in Confort,
touching
Impulsion, and
Percussion.

763

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth discusse the *Torpes* of *Solide Bodies*; Which beside their *Motion* of *Gravity*, have in them a *Naturall Appetite*, not to move at all; And partly, because a *Body* that *resteth*, doth get, by the *Resistance* of the *Body* upon which it *resteth*, a stronger *Compression*

Compression of *Paris*, than it hath of it *Selfe*: And therefore needeth more *Force* to be put in *Motion*. For if a *Weighty Body* be *Penile*, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very neare as easily, as if it were already in *Motion*.

A *Body* Over-great, or Over-small, will not be throwne so farre, as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *Proportion*, betweene the *Body Moved*, and the *Force*, to make it move well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moveth*, and the *Resistance* of the *Body* that is *Moved*: And if the *Body* be too great, it yeeldeth too little; And if it be too small, it resisteth too little.

It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid upon a *Body*, as *Falling*, or *strucken* from above. It may bee the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulsion*, or by the *Motion* of *Gravitie continued*, a *Compression* in them, as well downwards, as they have when they are throwne, or *Shot* thorow the *Aire* forwards. I conceive also, that the quicke *Loose* of that *Motion*, preventeth the *Resistance* of the *Body* below; And *Priority* of the *Force*, (alwayes,) is of great *Efficacie*; As appeareth in infinite *Instances*.

Tickling is most in the *Soles* of the *Feet*, and under the *Arme-Holes*, and on the *Sides*. The *Cause* is, the *Thinness* of the *Skin* in those *Parts*; Joyned with the *Rarenesse* of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinness* of the *Skin*, and *Suddenesse*, and *Rarenesse* of *Touch*, doe further: For we see, a *Feather*, or a *Rush*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddenesse*; Wee see no *Man* can tickle himselfe: Wee see also that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not *Ticklish*, because it is accustomed to be *Touched*. *Tickling* also causeth *Laughter*. The *Cause* may bee, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Titillation*; For upon *Tickling*, we see there is ever a *Starting*, or *Sbrinking* away of the *Part*, to avoid it; And we see also, that if you *Tickle* the *Nostrils* with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is ever *Painfull*, and not well endured.

Experiment
Solitary, touch-
ing, Titilla-
tion.

766

It is strange, that the *River* of *Nilus*, Over-flowing, as it doth, the *Countrie* of *Egypt*, there should be neverthelesse little or no *Raine* in that *Countrie*. The *Cause* must be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may bee ascribed, either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*; Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *Waters* upon the *Fire* doe vapour so much, after some time of *Boyling*, as at the *first*. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in *Taste*; And it is excellent *Good* for the *Stone*, and *Hypochondriacall Melancholy*; Which sheweth it is *Lenifying*: And it runneth thorow a *Countrie* of a *Hot Climate*, and flat, without *Shade*, either of *woods*, or *Hills*; Whereby the *Sunne* must needs have great *Power* to *Concoct* it. As for the *Aire*, (from whence I conceive this want of *Showres* commeth chiefly;) The *Cause* must

Experiment
Solitary, touch-
ing the
Scaritie of
Raine in
Egypt.

767

must be, for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as ever it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment
Solitary, touch-
ing Clarifi-
cation.

768

IT hath beene touched in the *Title* of *Percolations*, (Namely such as are *Inwards*;) that the *Whites* of *Egges*, and *Milke*, doe clarify, And it is certain, that in *Egypt*, they prepare and clarify the *Water* of *Nile*, by putting it into great *Tarres* of *Stone*, and Stirring it about with a few *Stamped Almonds*; Wherewith they also besmeare the Mouth of the *Vesell*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

Experiment
Solitary, touch-
ing Plants
without
Leaves.

769

THere be scarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Egypt*, a *Plant* which is Long, Leavelesse, Browne of Colour, and Branched like *Corall*, save that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts have a Superstitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Easie Deliverance*.

Experiment
Solitary, touch-
ing the
Materials of
Glasse.

770

THe *Chrystalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pavia*, by the *River Ticinum*; And the *Ashes* of a *Weed*, called by the *Arabs Kall*, which is gathered in a *Desart* betwene *Alexandria*, and *Rosetta*; And is by the *Egyptians* used first for *Fuell*; And then they crush the *Ashes* into *Lumps*, like a *Stone*; And so sell them to the *Venecians* for their *Glasse-works*.

Experiment
Solitary, touch-
ing Prohibi-
tion of Putre-
faction, and
the Long
Conservation
of Bodies.

771

IT is strange, and well to be noted, how long *Carkasses* have continued *Uncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Egypt*; Having lasted, as is conceived, (some of them,) three thousand yeares. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailles*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder: For we see, what a Soft and corruptible Substance the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth Experiment, *Purification*, which wee conceive to bee so *Natural* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that *Haste* to *Corruption*, that is conceived. And therefore *Bodies*, in *Shining-Amber*, in *Quick-Silver*; in *Balmes*, (whereof we now speake;) in *Wax*; in *Honey*; in *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserved very long. It need not goe for Repetition, if wee resume againe that which wee said in the afore-said Experiment, concerning *Annihilation*; Namely, that if you provide against three Causes of *Purification*, *Bodies* will not corrupt: The First is, that the *Ayre* be Excluded; For that undermineth the *Body*, and conspireth with the *Spirits* of the *Body* to dissolve it: The Second is, that the *Body* Adjacent and *Ambient*, be not *Commateriall*, but meere Heterogeneall towards the *Body* that is to be preserved: For if nothing can bee received by the One, Nothing can issue from the Other, Such are *Quick-Silver*, and *White-Amber*, to *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserved, be not of that *Grosse*, that it may corrupt within it selfe, although no Part of it issue into the *Body* Adjacent: And therefore it must be rather *Thin*, and

and *Small*, than of *Bulke*. There is a Fourth Remedie also, which is; That if the *Body* to be preserved be of *Bulke*, as a *Corps* is, then the *Body* that incloseth it, must have a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Purification* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifex*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to bee seene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Books*, they were found as fresh, as if they had been but newly Written; being written in *Parchment*, and covered over with *Wax-Candles* of *wax*; three or four fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the Cause that the *Body* was utterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Caesar* visited the *Sepulchre* of *Alexander the Great*, in *Alexandria*, he found the *Body* to keep his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so Tender, as *Caesar* touching but the *Nose* of it, defaced it. Which maketh me finde it very strange, that the *Egyptian Mummies* should be reported to be as hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very *Materiall*; Namely, that the Ancient *Egyptian Mummies*, were throwed in a Number of Folds of *Linnen*, besmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practised upon the *Body* of *Alexander*.

NEare the *Castle* of *Caie*, and by the wells of *Affan*, in the *Land* of *Idumea*, a great Part of the *Way*, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, upon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

THe *Dead-Sea*, which vomiteth up *Bitumen*, is of that *Crafftitude*, as *Living Bodies* bound Hand and Foot, cast into it, have been borne up, and not sunke. Which sheweth, that all *Sinking* into *Water*, is but an *Overweight* of the *Bodie*, put into the *Water*, in respect of the *Water*: So that you may make *Water* so strong, and heavy, of *Quick-Silver*, (perhaps,) or the like, as may beare up *Iron*: Of which I see no Use, but *Imposture*. We see also, that all *Metalls*, except *Gold*, for the same reason swimme upon *Quick-Silver*.

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke-Stone* (whereof *Pilgrims* make *Fires*;) which burneth like a *Coale*, and diminisheth not; But onely waxeth Brighter, and Whiter. That it should doe so, is not strange; For we see *Iron Red Hot* burneth, and consumeth not: But the Strangenesse is, that it should continue any time so: For *Iron*, as soone as it is out of the *Fire*, deadeth straight-ways. Certainly, it were a Thing of great Use, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders wooll*; Being a Kind of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it

Experiment
Solitary, touch-
ing the
Abundance of
Nitre in
certain Sea-
Shores.

772

Experiment
Solitary, touch-
ing Bodies
that are borne
up by water.

773

Experiment
Solitary, touch-
ing Fuell,
that consu-
meth little, or
nothing.

774

is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oyle*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wicke* not burne.

Experiment
Solitary, touching
Economically
touching
cheape
Fuel.

775

Sea-Coale last longer than Char-Coale; And Char-Coale of *Roots*, being coaled into great Peeeces, last longer than Ordinary Char-Coale. Turfe and Peat, and Cow-Sheards, are cheape Fuels, and last long. Small-Coale, or Briar-Coale, powred upon Char-Coale, make them last longer. Sedge is a cheap Fuel to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of Sea-Coale with Earib, or Chalke; For if that Mixture be, as the Sea-Coale-Men use it, privily, to make the Bulke of the Coale greater, it is Deceit; But if it bee used purposely, and bee made knowne, it is Saving.

Experiment
Solitary, touching
the
Gathering of
Winds for
Fresheesse.

776

It is, at this Day, in use, in *Gaza*, to couch Pot-Sheards or Vessels of Earib, in their Walls, to gather the Wind from the Top, and to passe it downe in Spouts into Roomes. It is a Device for Fresheesse, in great Heats: And it is said, there are some Roomes in Italy, and Spaine, for Fresheesse, and Gathering the Winds, and Aire, in the Heats of Summer. But they be but Pennings of the Winds, and Enlarging them againe, and making them Reverberate, and goe Round in Circles, rather than this Device of Spouts in the Wall.

Experiment
Solitary, touching
the
Trials of
Aires.

777

THere would be used much diligence, in the Choice of some Bodies, and Places, (as it were,) for the Tasting of Aire; to discover the wholesomenesse, or Unwholesomenesse, as well of Seasons, as of the Seats of Dwellings. It is certaine, that there be some Houses, wherein Confitures, and Pies, will gather Mould, more than in Others. And I am perswaded, that a Peece of Raw Flesh, or Fish, will sooner corrupt in some Aires, than in Others. They be noble Experiments, that can make this Discovery; For they serve for a Naturall Division of Seasons; Better than the Astronomers can by their Figures: And againe, they teach Men where to chuse their Dwelling, for their better Health.

Experiment
Solitary, touching
Increasing
of Milke
in Milke
Beasts.

778

THere is a Kinde of Stone, about Beithleem, which they grinde to Powder, and put into Water, whereof Castell drinke; Which maketh them give more Milke. Surely, there would be some better Trialls made of Mixtures of Water in Ponds for Castell to make them more Milke; Or to Fatten them; Or to Keepe them from Murraine. It may bee, Chalke, and Niire, are of the best.

Experiment
Solitary, touching
Sand
of the Nature
of Glasse.

779

It is reported, that in the Valley, neare the Mountaine Carmel, in Iudea, there is a Sand, which, of all other, hath most Affinitie with Glasse; Inasmuch as other Minerals, laid in it, turne to a Glasie Substance, without the Fire; And againe Glasse put into it, turneth into the Mother-Sand. The Thing is very strange, if it be true: And it is likeliest to be Caused by some Natural Furnace, or Heat in the Earth: And yet they doe not speake of any Eruption of Flames. It were good to trie in Glasse-Works, whether the Crude Materials of Glasse, mingled with Glasse already made and Re-moulten, doe not facilitate the Making of Glasse with lesse Heat.

In

IN the Sea, upon the South-west of Sicily, much Corall is found. It is a *Sub-Marine Plant*. It hath no Leaves: It brancheth onely when it is under Water; It is Soft, and Greene of Colour; But being brought into the Aire, it becommeth Hard, and Shining Red, as we see. It is said also, to have a white Berry; But we finde it not brought over with the Corall. Belike it is cast away as nothing worth: Inquire better of it, for the Discovery of the Nature of the Plant.

Experiment
Solitary, touching
the
Growth of
Corall.

780

THe Manna of Calabria is the best, and in most Plenty. They gather it from the Leafe of the Mulberry Tree; But not of such Mulberry Trees, as grow in the Valley's. And Manna falleth upon the Leaves by Night, as other Dewes doe. It should seem, that before those Dewes come upon Trees in the Valley's, they dissipate and cannot hold out. It should seeme also, the Mulberry-Leafe, it selfe hath some Coagulating Vertue, which inspissateth the Dew, for that it is not found upon other Trees: And wee see by the Silke-worme, which feedeth upon that Leafe, what a Dainty Smooth Iuyce it hath; And the Leaves also, (especially of the Blacke Mulberry,) are somewhat Bristly, which may helpe to preserve the Dew. Certainly, it were not amisse, to observe a litle better, the Dewes that fall upon Trees, or Herbs, Growing on Mountaines: For it may bee, many Dewes fall, that spend before they come to the Valley's. And I suppose, that he that would gather the best May-Dew for Medicine, should gather it from the Hills.

Experiment
Solitary, touching
the
Gathering of
Manna.

781

IT is said, they have a manner, to prepare their Greeke-Wines, to keep them from Fuming, and Inebriating, by adding some Sulphur, or Allome: Whereof the one is Vntuous, and the other is Astringent. And certaine it is, that those two Natures doe best repress Fumes. This Experiment would be transferred, unto other Wine, and Strong Beere, by Putting in some like Substances, while they worke; Which may make them both to Fume lesse, and to Inflame lesse.

Experiment
Solitary, touching
the
Corriving of
Wine.

782

IT is conceived by some, (not improbably,) that the reason, why Wilde-Fires, (Whereof the principall Ingredient is Bitumen,) doe not quench with Water, is, for that the first Concretion of Bitumen, is a Mixture, of a Fiery, and Watry Substance: So is not Sulphur. This appeareth, for that in the Place neare Puteoli, which they call the Court of Vulcan, you shall heare under the Earib a Horrible Thundring of Fire, and Water, conflieting together: And there breake forth also Spouts of Boiling Water. Now that Place yeeldeth great Quantities of Bitumen; Whereas Aina, and Vesuvius, and the like, which consist upon Sulphur, shoot forth Smoake, and Ashes, and Pumice, but no Water. It is reported also, that Bitumen mingled with Lime, and Put under Water, will make, as it were, an Artificiall Rocke; The Substance becommeth so Hard.

Experiment
Solitary, touching
the
Materials of
Wilde-Fire.

783

THere is a Cement, compounded of Flower, Whites of Egges, and Stone powdered, that becommeth Hard as Marble; wherewith Piscina Mirabilis, neare Cuma, is said to have the Walls Plastered. And it is certaine, and tried, that the Powder of Load-Stone, and Flint, by the Addition of Whites of Egges, and Gumme-Dragon, made into Paste, will in a few dayes harden to the Hardnesse of a Stone.

Experiment
Solitary, touching
Plaster
growing as
hard as
Marble.

784

It

Experiment
Solitary, touch-
ing the Judg-
ment of the
Cure in some
Vlcers and
Hurts.

785

IT hath beene noted by the *Ancients*, that in *Full*, or *Impure Bodies*, *Vlcers* or *Hurts* in the *Legges*, are *Hard to Cure*; And in the *Head* more easie. The *Cause* is, for that *Vlcers* or *Hurts* in the *Legges* require *Desiccation*, which by the *Deflexion of Humours* to the *Lower Parts* is hindered; Where-as *Hurts* and *Vlcers* in the *Head* require it not; But contrariwise *Driness* maketh them more apt to *Consolidate*. And in *Moderne Observation*, the like difference hath beene found, betweene *French-Men*, and *English-Men*; Whereof the ones *Constitution* is more *Drie*, and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

Experiment
Solitary, touch-
ing the
Healthe of the
Vnehealth-
fulness of the
Southerne
Winde.

786

IT hath beene noted by the *Ancients*, that *Southerne Windes*, blowing much, without *Raine*, doe cause a *Fevorous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Windes* doe, of themselves, qualifie the *Aire*, to be apt to cause *Fevers*; But when *Showers* are joyned, they doe *Refrigerate* in Part, and Checke the *Sultry Heat* of the *Southerne Winde*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

Experiment
Solitary, touch-
ing Wounds.

787

IT hath beene noted by the *Ancients*, that *Wounds* which are made with *Brasse*, heale more easie, than *Wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanative Vertue*. And so in the very *Instant* helpeth somewhat: But *Iron* is *Corrosive*, and not *Sanative*. And therefore it were good, that the *Instruments* which are used by *Chirurgions* about *Wounds*, were rather of *Brasse*, than *Iron*.

Experiment
Solitary, touch-
ing the
Mortification
by Cold.

788

IN the *Cold Countries*, when *Mens Noses*, and *Eares* are *Mortified* and (as it were) *Gangrened* with *Cold*, if they come to a *Fixe*, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Purification* is made *Compleat*. But *Snow* put upon them, helpeth; For that it preserveth those *Spirits* that remaine, till they can revive; And besides, *Snow* hath in it a *Secret Warmth*: As the *Monke* proved out of the *Text*, *Qui dat Nivem sicut Lanam, Gelo sicut Cineres spargit*. Whereby he did inferre, that *Snow* did warme like *Wool*, and *Frost* did fret like *Ashe*. *Warmed Water* also doth good; Because by little and little it openeth the *Pores*, without any sudden *Working* upon the *Spirits*. This *Experiment* may be transferred unto the *Cure* of *Grangrenes*, either coming of themselves, or induced by too much applying of *Opiates*: Wherein you must beware of *Drie Heat*, and resort to Things that are *Refrigerant*, with an *Inward Warmth*, and *Vertue* of *Cherishing*.

Experiment
Solitary, touch-
ing weight.

789

WEigh *Iron*, and *Aqua Fortis*, severally; Then dissolve the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *Weight*, as the *Bodies* did severally: Notwithstanding a good deale of *Wast*, by a thicke *Vapour*, that issueth during the *Working*: Which sheweth that the *Opening* of a *Body*, doth increase the *Weight*. This was tried once, or twice, but I know not whether there were any *Error*, in the *Trial*.

Experiment
Solitary, touch-
ing the
Super-Natura-
tion of Bodies.

790

TAKE of *Aqua Fortis* two Ounces, of *Quick-Silver* two Drachmes, (For that Charge the *Aqua Fortis* will bear;) The *Dissolution* will not beare a *Flin*, as big as a *Nutmeg*: Yet (no doubt) the *Increasing* of the *Weight* of *Wa-*

ter will increase his *Power* of *Bearing*, as we see *Broine*, when it is *Salt* enough, will beare an *EGGE*. And I remember well a *Physitian*, that used to give some *Mineral Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in *Ordinary Water*. But it seemeth, the *Weight* of the *Quick-Silver*, more than the *Weight* of a *Stone*, doth not compense the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

LET there be a *Body* of *Vnequall weight*; (As of *VVood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *VVeightier End* will recover to be *Forwards*; Unless the *Body* be *Over-long*. The *Cause* is, for that the more *Dense Body*, hath a more *Violent Pressure* of the *Parts*, from the first *Impulsion*; Which is the *Cause*, (though heretofore not found out, as hath beene often said,) of all *Violent Motions*: And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure* of *Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turne over: For (turned) it can more easily draw forward the *Lighter Part*. *Galileus* noteth it well; That if an *Open Trough*, wherein *VVater* is, be driven faster then the *VVater* can follow, the *VVater* gathereth upon an heape, to wards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runne the *VVater*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *VVood*, of the same *Magnitude*, and *Shape*, and throw them with equall *Force*, you cannot possibly throw the *VVood*, so farre, as the *Stone*, or *Iron*.

IT is certaine, (as it hath beene formerly, in part, touched,) that *VVater* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottom* of the *VVater*, it maketh a *Sound*. So a long *Pole* struck upon *Gravell*, in the *Bottom* of the *VVater*, maketh a *Sound*. Nay, if you should thinke that the *Sound* cometh up by the *Pole*, and not by the *VVater*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no *Solide Body*, whereby the *Sound* can ascend.

ALL *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horror*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* Shiver. For *Tastes*, we see, that in the *Taking* of a *Potion*, or *Pills*, the *Head*, and the *Necke*, shake. For *Odious Smells*, the like Effect followeth, which is lesse perceived, because there is a *Remedy* at hand, by *Stopping* of the *Nose*: But in *Horses*, that can use no such *Help*, we see the *Smell* of a *Carriion*, especially of a *Dead Horse*, maketh them fly away, and take on, almost as if they were *Mad*. For *Feeling*, if you come out of the *Sunne*, suddenly into a *Shade*, there followeth a *Chillnesse* or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious Object*, Comming into *Sudden Darknesse*, induceth an *Offer* to *Shiver*.

THERE is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath *Windowes* only from above: It is in *Length* an *Hundred Feet*, in *Breadth* *Twenty Feet*, and in *Height* neare *Fifty*; Having a *Doore* in the *Middest*. It reporteth

Experiment
Solitary, touch-
ing the
Flying of Vne-
quall Bodies
in the Aire.

791

Experiment
Solitary, touch-
ing water,
that it may be
the Medium
of Sounds.

792

Experiment
Solitary of the
Flight of the
Spirits upon
Odious Objects

793

Experiment
Solitary, touch-
ing the
Super-Reflexi-
on of Eccles's.

794

porteth the *Voice*, twelve or thirteene times, if you stand by the *Clofe End-wall*, over against the *Doore*. The *Echo* fadeth, and dyeth by little and little, as the *Echo* at *Pont-charcmon* doth. And the *Voice* soundeth, as if it came from above the *Doore*. And if you stand at the *Lower End*, or on either *Side* of the *Doore*, the *Echo* holdeth; But if you stand in the *Doore*, or in the *Middest* just over against the *Doore*, not. Note that all *Echo's* sound better against *Old walls*, than *New*; Because they are more *Drie*, and *Hollow*.

Experiment
Solitary, touch-
ing the
Force of Im-
agination, Imit-
ating that of
the *Sense*.

795

Those *Effects*, which are wrought by the *Percussion* of the *Sense*, and by *Things* in *Fact*, are produced likewise in some degree, by the *Imagination*. Therefore if a Man see another cate *Soure* or *Acide Things*, which set the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that seeth the *Thing* done by another, hath his own *Teeth* also set on edge. So if a Man see another turne swiftly, and long; Or if he look upon *Wheels* that turne, Him-
selfe waxeth *Turne-sick*. So if a Man be upon an *High Place*, without *Railers*, or good *Hold*, except he be used to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bled*, or *Strangled*, or *Tortured*, Themselves are ready to faint, as if they *Bled*, or were in *Sirife*.

Experiment
Solitary, touch-
ing *Preser-
vation* of
Nerves.

796

Take a *Stoeke-Gilly-Flower*, and tie it gently upon a *Stick*, and put them both into a *Stoepe Glasse*, full of *Quick-silver*, so that the *Flower* bee covered: Then lay a little *Weight* upon the *Top* of the *Glasse*, that may keepe the *Sticke* downe; And looke upon them after foure or five dayes; And you shall finde the *Flower* *Fresh*, and the *Stalke* *Harder*, and lesse *Flexible*, than it was. If you compare it with another *Flower*, gathered at the same time, it will be the more manifest. This sheweth that *Bodies* doe preserve excellently in *Quick-silver*; And not preserve onely, but, by the *Coldnesse* of the *Quick-silver*, *Indurate*; For the *Freshnesse* of the *Flower* may be merely *Conservation*; (which is the more to be observed, because the *Quick-silver* preserveth the *Flower*;) But the *Stiffenesse* of the *Stalke*, cannot be without *Induration*, from the *Cold* (as it seemeth,) of the *Quick-silver*.

Experiment
Solitary, touch-
ing the
Growth, or
Multiplying of
Metalls.

797

It is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the *Ground*, if it bee well *Watered*, will increase into *Greater Peeces*. This is certaine, and knowne of *Old*; That *Lead* will multiply, and Increase; As hath been seene in *Old Statuas* of *Stone*, which have beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time) there appeared, that the *Lead* did swell; Inasmuch as it hanged upon the *Stone* like *Warts*.

Experiment
Solitary, touch-
ing the
Drowning of
the more *Base*
Metal in the
more *Precious*.

798

Call *Drowning* of *Metalls*, when that the *Baser Metall*, is so incorporate with the more *Rich*, as it can by no *Meanes* bee separated againe: which is a kinde of *Version*, though *False*: As if *Silver* should be inseparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Silver*. The *Ancient Eletrum* had in it a Fifth of *Silver* to the *Gold*; And made a *Compound Metall*, as fit for most uses, as *Gold*; And more *Resplendent*, and more *Qualified* in some other *Properties*; But then that was easily Separated. This to doe privily, or to make the *Compound* passe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it bee done *Avowedly*, and without *Disguizing*, it may be a great *Saving* of the *Richer Metall*. I remember to have heard of a *Man*, skillfull in *Metalls*, that a *Fifteenth Part* of *Silver*, incorporate with

Gold,

Gold, will not be Recovered by any *Manner* of *Separation*; Except you put a *Greater Quantitie* of *Silver*, to draw to it the *Lesse*; which (hee said) is the last *Refuge* in *Separations*. But that is a tedious way, which no *Man* (almost) will thinke on. This would be better enquired; And the *Quantity* of the *Fifteenth* turned to a *Twentieth*; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metall*), will not be detected; If you take so much the more *Silver*, as will countervail the *Over-weight* of the *Lead*.

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet *Imeteth* without much difficultie. The *Melting* sheweth that it is not *Jeune*, or *Scarce* in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Clofe Coacervation* of them: Whereby they have the lesse *Appetite*, and no *Meanes* (at all) to issue forth. It were good therefore to trie, whether *Glasse Re-moulten* doe leese any *Weight*? For the *Parts* in *Glasse* are evenly *Spred*; But they are not so *Clofe* as in *Gold*; As we see by the *Easie Admission* of *Light*, *Heat*, and *Cold*; And by the *Smallnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As we see in the *Stuffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Clofenesse* of the *Tangible Parts*; And the *Jejunenesse* or *Extreme Commi-
nution* of *Spirits*: Of which Three, the two First may bee joyned with a *Nature Liquefiable*; The Last not.

It is a *Profound Contemplation* in *Nature*, to consider of the *Emptinesse*, (as we may call it,) or *Insatisfaction* of severall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it with a kinde of *Thirst*, as not satisfied with his owne former *Constitution*; For else it would never receive them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receive *Drie* and more *Terrestrial Bodies*, Proportionable: And *Drie Bodies*, on the other side, drinke in *Waters*, and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Vary Substances*.) One is a *Glue* to another, *Parchement*, *Skins*, *Club*, &c. drinke in *Liquours*, though themselves be *Entire Bodies*, and not *Comminted*, as *Sand*, and *Alber*; Not apparently *Porous*: *Metalls* themselves doe receive in readily *Strong-waters*; And *Strong-waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-water* will touch upon *Gold*, that will not touch upon *Silver*; And *è Converso*. And *Gold*, which seemeth by the *Weight*, to be the *Clofest*, and most *Solide Body*, doth greedily drinke in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not *Violent*: For it is (many times) *Reciprocall*, and as it were with *Consent*. Of the *Cause* of this, and to what *Axiome* it may bee referred, consider attentively; For as for the *Pretty Affection*, that *Matter* is like a *Common Sirumpet*, that desireth all *Formes*, it is but a *VVandering Notion*. Onely *Flame* doth not content it selfe to take

in any other *Body*; But either to overcome and turne another *Body* into it selfe, as by *Victory*; Or it selfe to dye, and goe out.

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Experiment
Solitary, touch-
ing *Fixation*
of *Bodies*.

799

Experiment
Solitary, touch-
ing the
Appetite of
Things
in Themselves,
and their *De-
sire* to change.

800



NATVRALL HISTORIE.

IX. Century.



It is certaine, that all *Bodies* whatsoever, though they have no *Sense*, yet they have *Perception*: For when one *Body* is applied to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* be *Alterant*, or *Altered*, evermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception*, in some Kinde of *Bodies*, is farre more Subtill than the *Sense*; So that the *Sense* is but a dull thing in Comparison of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as upon the *Touch*; As when the *Load-Stone* draweth *Iron*; or *Flame* fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subject* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Sense*; And sometimes Better. And besides, it is a Principall *Meane* of *Naturall Divination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serveth to discover that which is *Hid*, as well as to foretell that which is to

Experiments
in Comfort,
touching Per-
ception in Bo-
dies Inseparable,
tending to
Naturall Divi-
nation, or
Subtill Tralls.

Come ; As it is in many *Subtill Trialls* ; As to trie whether *Seeds* be old, or new, the *Sense* cannot informe : But if you boile them in *Water*, the *New Seeds* will sprout sooner : And so of *Water*, the *Taste* will not discover the best *Water* ; but the *Speedy Consuming* of it, and many other *Meanes*, which wee have heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall Inclinations* of the *Minde*, which *Disimulation* will conceale, or *Discipline* will suppress. Wee shall therefore now handle onely, those two *Perceptions*, which pertaine to *Naturall Divination*, and *Discovery* : Leaving the Handling of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Divination* is attained by other *Meanes* ; As if you know the *Causes* ; If you know the *Concomitants* ; you may judge of the *Effect* to follow : And the like may be said of *Discovery* ; But we tie our Selves here, to that *Divination* and *Discovery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blasting*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Vn-wholesome Teares*.

801 The *Wind* blowing much from the *South*, without *Raine* ; And *Wormes* in the *Oake-Apple* ; have bene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestilentiall Teares*.

802 Great, and *Early Heats* in the *Spring*, (and namely in *May*), without *winds*, portend the same ; And generally so doe *Teares* with little *Wind*, or *Thunder*.

803 Great *Droughts* in *Summer*, lasting till towards the *End* of *August*, and some *Gentle Showres* upon them ; And then some *Drie Weather* againe ; Doe portend a *Pestilem Summer*, the *Yeare* following : For about the *End* of *August*, all the *Sweetnesse* of the *Earth*, which goeth into *Plants*, and *Trees*, is exhaled ; (And much more if the *August* be drie ;) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to Corrupt the *Aire* : And that *Vapour*, by the first *Showres*, if they be *Gentle*, is released, and commeth forth abundantly. Therefore they that come abroad soone after those *Showres*, are commonly taken with *Sickness* : And in *Affricke*, no *Body* will stirre out of doores, after the first *Showres*. But if the first *Showres* come vehemently, then they rather wash and fill the *Earth*, than give it leave to breathe forth presently. But if *Drie Weather* come againe, then it fixeth and continueth the *Corruption* of the *Aire*, upon the first *Showres* begun ; And maketh it of ill *Influence*, even to the *Next Summer* ; Except a very *Froste Wimer* discharge it ; Which seldome succeedeth such *Droughts*.

804 The *Lesser Infections*, of the *Small Pocks*, *Purple Feavers*, *Agues*, in the *Sum-*

mer

mer *Precedent*, and hovering all *Winter*, doe portend a great *Pestilence* in the *Summer* following ; For *Putrefaction* doth not rise to his height at once.

It were good to lay a *Peece* of *Raw Flesh*, or *Fish*, in the *Open Aire* ; And if it *Putrefie* quickly, it is a *Signe* of a *Disposition* in the *Aire* to *Putrefaction*. And because you cannot be informed, whether the *Putrefaction* be quicke or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amisse in the same *Yeare*, and at the same *Time*, to lay one *Peece* of *Flesh*, or *Fish*, in the *Open Aire*, and another of the same *Kinde* and *Bignesse*, within *Doores* : For I Judge, that if a generall *Disposition* be in the *Aire* to *Putrefie*, the *Flesh*, or *Fish*, will sooner *Putrefie* abroad, where the *Aire* hath more power, than in the *House*, where it hath lesse, being many wayes corrected. And this *Experiment* would be made about the *End* of *March* : For that *Season* is likest to discover, what the *Winter* hath done ; And what the *Summer* following will doe upon the *Aire*. And because the *Aire* (no doubt) receiveth great *Tincture*, and *Infusion* from the *Earth* ; It were good to trie that *Exposing* of *Flesh*, or *Fish*, both upon a *Stake* of *Wood*, some height above the *Earth*, and upon the *Flat* of the *Earth*.

Take *May-Dew*, and see whether it *putrefie* quickly, or no ? For that likewise may disclose the *Quality* of the *Aire*, and *Vapour* of the *Earth*, more or lesse *Corrupted*.

A *Drie March*, and a *Drie May*, portend a *Wholesome Summer*, if there bee a *Showring April* betweene : But otherwise, it is a *Signe* of a *Pestilentiall Yeare*.

As the *Discoverie* of the *Disposition* of the *Aire*, is good for the *Prognosticks* of *Wholesome*, and *Vnwholesome Teares* ; So it is of much more use, for the *Choice* of *Places* to dwell in : At the least, for *Lodges*, and *Retiring Places* for *Healib* ; (For *Mansion Houses* respect *Provisions*, as well as *Healib* ;) Wherein the *Experiments* above mentioned may serve.

But for the *Choice* of *Places*, or *Seats*, it is good to make *Triall*, not onely of *Aptnesse* of *Aire* to corrupt, but also of the *Moisture* and *Driness* of the *Aire* ; and the *Temper* of it, in *Heat*, or *Cold* ; For that may concerne *Healib* diversly. We see that there be some *Houses*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others ; And *Waincoats* will will also sweat more ; so that they will almost runne with *Water* : All which, (no doubt,) are caused chiefly by the *Moistnesse* of the *Aire*, in those *Seats*. But because it is better to know it, before a *Man* buildeth his *House*, than to finde it after, take the *Experiments* following.

Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would trie, comparing it with some other *Places* ; And see whether it doth not moisten, and make the *wooll*, or *Sponge*, &c. more *Ponderous*, than the other ? And if it doe, you may judge of that *Place*, as Situate in a *Grosse*, and *Moist Aire*.

Because it is certaine, that in some *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more *Unequall*, than in Others ; And *Inequality* of *Aire* is ever an *Enemy* to *Healib* ; It were good to take two *Weather-Glasses*, *Matches* in all things, and to set them, for the same *Houres* of One day, in severall *Places*, where no *Shade* is, nor *Enclosures* : And to marke when you set them, how farre the *Water* commeth ; And to compare them, when you come againe, how the *Water* standeth then : And if you finde them *Unequall*, you may be sure that the *Place* where the *Water* is lowest, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequality* be, of the *Ascent*, or *Descent* of the *Water*, the greater is the *Inequality* of the *Temper* of the *Aire*.

812 The Predictions likewise of Cold and Long *Winters*, and Hot and Drie Summers, are good to be knowne; As well for the Discovery of the Causes, as for divers Provisions. That of Pleny of Hawes and Heps, and Briar-Berries, hath beene spoken of before. If *VVaincoat*, or Stone, that have used to Sweat, be more drie in the Beginning of *Winter*; Or the Drops of the Eaves of Houses come more slowly downe, than they use; it portendeth a Hard and Frostie *Winter*. The Cause is, for that it sheweth an Inclination of the *Aire*, to Drie *Weather*; which in *Winter* is ever joyned with Frost.

813 Generally, a Moist and a Coole Summer, portendeth a Hard *Winter*. The Cause is, for that the Vapours of the Earth, are not dissipated in the Summer, by the Sunne; And so they rebound upon the *Winter*.

814 A Hot and Drie Summer, and Autumne, and especially if the Heat and Drought extend farre into September, portendeth an Open Beginning of *Winter*; And Colds to succeed, toward the latter Part of the *Winter*, and the Beginning of the Spring: For till then, the former Heat and Drought beare the Sway; And the Vapours are not sufficiently Multiplied.

815 An Open and *Warme Winter* portendeth a Hot and Drie Summer: For the Vapours disperse into the *Winter* Showers, Whereas Cold and Frost keepeth them in, and transporteth them into the late Spring, and Summer following.

816 Birds that use to change Countreies, at certaine Seasons, if they come Earlier, doe shew the Temperature of *Weather*, according to that Countrie whence they came: As the *Winter-Birds*, (namely, *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the Northerne Countreies, with us shew Cold *Winters*. And if it be in the same Countrey, then they shew a Temperature of Season, like unto that Season in which they come: As *Swallows*, *Bats*, *Cuckoos*, &c. that come towards Summer, if they come early, shew a Hot Summer to follow.

817 The Prognosticks, more Immediate, of *Weather* to follow soone after, are more Certaine than those of Seasons. The Resounding of the Sea upon the Shore; And the Murmur of *Winds* in the *Woods*, without apparent *Wind*, shew *Wind* to follow: For such *Winds*, breathing chiefly out of the Earth, are not at the first perceived, except they be pent, by *Water*, or *Wood*. And therefore a Murmur out of Caves likewise portendeth as much.

818 The Upper Regions of the *Aire*, perceive the Collection of the Matter of Tempest, and *Winds*, before the *Aire* here below: And therefore the Obscuring of the Smaller Starres is a Signe of Tempests following. And of this kind you shall finde a Number of Instances in our Inquisition De Ventis.

819 Great Mountaines have a Perception of the Disposition of the *Aire* to Tempests, sooner than the Valley's or Plaines below: And therefore they say in *Vales*, when certaine Hills have their Night-Caps on, they meane Mischiefe. The Cause is, for that Tempests, which are for the most part bred above, in the Middle Region, (as they call it,) are soonest perceived to collect in the Places next it.

820 The *Aire*, and Fire, have subtil Perceptions of *Wind* Rising, before Men finde it. We see the Trembling of a Candle will discover a *Wind* that otherwise we do not feele; And the Flemons Burning of Flames doth shew the *Aire* beginneth to be unquiet; And so doe Coales of Fire by casting off the Ashes more then they use. The Cause is, for that no *Wind*, at the first, till it hath strooke and driven the *Aire*, is Apparent to the Sense: But Flame is easier to move, than *Aire*: And for the Ashes, it is no marvell, though *Wind* unperceived shakethem off; For wee usually trie, which way the *Wind* bloweth,

bloweth, by casting up Grasse, or Chaffe, or such light things into the *Aire*.

When *Wind* expireth from under the Sea; As it causeth some Resounding of the *Water*, (whereof we spake before,) so it causeth some Light Motions of Bubbles, and White Circles of Froth. The Cause is, for that the *Wind* cannot be perceived by the Sense, untill there be an Eruption of a great Quantity, from under the *Water*; And so it getteth into a Body: Whereas in the first Putting up it commeth in little Portions.

We spake of the Ashes, that Coales cast off; And of Grasse, and Chaffe carried by the *Wind*; So any Light Thing that moveth, when we finde no *Wind*, sheweth a *Wind* at hand: As when Feathers, or Downe of Thistles, fly to and fro in the *Aire*.

For Prognosticks of *Weather* from Living Creatures, it is to be noted; That Creatures that live in the Open *Aire*, (*Sub Dio*,) must needs have a Quicker Impression from the *Aire*, than Men that live most within Doores; And especially Birds who live in the *Aire*, freest, and Clearest; And are aptest by their Voice to tell Tales, what they finde; And likewise by the Motion of their Flight to expresse the same.

Water-Fowles, (as Sea-Gulls, More-Hens, &c.) when they flocke and flie together, from the Sea towards the Shores; And contrariwise, Land-Birds, (as Crows, Swallows, &c.) when they fly from the Land to the Waters, and beat the Waters with their Wings; doe fore-shew Raine, and Wind. The Cause is, Pleasure, that both Kindes take in the Moistnesse, and Densitie of the *Aire*: And so desire to be in Motion, and upon the Wing, whither soever they would otherwise goe: For it is no Marvell, that Water-Fowle doe joy most in that *Aire*, which is likest *Water*; And Land-Birds, also, (many of them,) delight in Basking, and Moist *Aire*. For the same Reason also, many Birds doe proine their Feathers; And Geese doe gaggle; And Crows seeme to call upon Raine: All which is but the Comfort they seeme to receive in the Relenting of the *Aire*.

The Heron, when she soareth high, (so as sometimes she is seene to passe over a Cloud,) sheweth Winds: But Kites flying aloft, shew Faire and Drie Weather. The Cause may be, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the Heron, being a Water-Fowle, taketh pleasure in the *Aire*, that is Condensed: And besides, being but Heavy of Wing, needeth the Help of the Grosser *Aire*. But the Kite affecteth not so much the Grossenesse of the *Aire*, as the Cold and Freshnesse thereof. For being a Bird of Prey, and therefore Hot, she delighteth in the Fresh *Aire*; And (many times) flyeth against the Wind; As Troues, and Salmones swimme against the Streame. And yet it is true also, that all Birds finde an Ease in the depth of the *Aire*; As Swimmers doe in a Deepe Water. And therefore when they are aloft, they can uphold themselves with their Wings spread, scarce moving them.

Fishes, when they play towards the Top of the *Water*, doe commonly fore-tell Raine. The Cause is, for that a Fish hating the Drie, will not approach the *Aire*, till it groweth Moist; And when it is Dry, will fly it, and swimme lower.

Beasts doe take Comfort, (generally,) in a Moist *Aire*; And it maketh them eat their Meats better: And therefore Sheepe will get up betimes in the

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the Morning, to feed, against Raine: And Cattel, and Deere, and Conneys, will feed hard before Raine: And a Heifer, will put up his Nose, and snuffe in the Aire, against Raine.

827 The Trifole, against Raine, swelleth in the Stalke; and so standeth more upright; For by Wet, Stalkes doe erect, and Leaves bow downe. There is a Small Red Flower in the Stubble-Fields, which Countrey People call the *Wincopipe*; Which if it open in the Morning, you may be sure of a faire Day to follow.

828 Even in Men, Aches, and Hurts, and Cornes, doe engrieve, either towards Raine, or towards Frost: For the One maketh the Humours more to Abound; And the Other maketh them Sharper. So we see both Extremes bring the Gout.

829 Wormes, Vermine, &c. doe fore-shew (likewise) Raine: For Earth-Wormes will come forth, and Moules will cast up more, and Fleas bite more, against Raine.

830 Solide Bodies likewise fore-shew Raine. As Stones, and Wainscot, when they Sweat: And Boxes, and Pegges of Wood, when they Draw, and Wind hard; Though the Former be but from an Outward Cause; For that the Stone, or Wainscot, turneth and beateth back the Aire against it selfe; But the latter is an Inward Swelling of the Body of the Wood it selfe.

Experiment Solitary, touching the Nature of Appetite in the Stomach.

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Appetite is moved chiefly by Things that are Cold, and Dry; The Cause is, for that Cold is a Kinde of Indigence of Nature, and calleth upon Supply; And so is Drinesse: And therefore all Soure Things, (as Vinegar, Juice of Limons, Oyle of Vitrioll, &c.) provoke Appetite. And the Disease, which they call *Appetitus Caninus*, consisteth in the Matter of an Acide and Glassy Flegme, in the Mouth of the Stomach. Appetite is also moved by Soure Things; For that Soure Things, induce a Contraction in the Nerves, placed in the Mouth of the Stomach; which is a great Cause of Appetite. As for the Cause, why Onions, and Salt, and Pepper, in Baked Meats, move Appetite, it is by Vellication of those Nerves; For Motion whetteth. As for Worme Wood, Oliver, Capers, and others of that kinde, which participate of Bitternesse, they move Appetite by Absterfion. So as there bee foure Principall Causes of Appetite; The Refrigeration of the Stomach joyned with some Drinesse; Contraction; Vellication; And Absterfion: Besides Hunger, which is an Emptinesse: And yet Over-Fasting doth (many times) cause the Appetite to cease; For that want of Meat maketh the Stomach draw Humours; And such Humours as are Light, and Cholericke, which quench Appetite most.

Experiment Solitary, touching Sweetnesse of Odour from the Rainbow.

832

It hath beene observed by the Antients, that where a Raine-Bow seemeth to hang over, or to touch, there breatheth forth a Sweet Smell. The Cause is, for that this happeneth but in certain Matters, which have in themselves some Sweetnesse; Which the Gentle Dew of the Raine-Bow doth draw forth: And the like doe Soft Showers; For they also make the Ground Sweet: But none are so delicate as the Dew of the Rain-Bow, where it falleth. It may be also, that the Water it selfe hath some Sweetnesse: For the Raine-Bow consisteth of a Glomeration of Small Drops, which cannot possibly fall, but from the Aire, that is very Low: And therefore may hold the very Sweetnesse of the Herbs, and Flowers, as a Distilled Water: For Raine, and other Dew, that fall from high, cannot preserve the Smell, being dissipated in the drawing up: neither doe we know, whether some Water it selfe may not have some degree of Sweetnesse. It is true, that wee finde it sensibly in no Poole, River,

nor

nor Fountaine; But good Earthe, newly turned up, hath a Freshnesse, and good Sent; Which water, if it be not too Equall, (For Equall Objects never move the Sense,) may also have. Certaine it is, that Bay-Salt, which is but a kinde of Water Congealed, will sometimes smell like Violets.

To Sweet Smells Heat is requisite, to Concoct the Matter; And some Moisture to Spread the Breath of them. For Heat, we see that Woods, and Spices, are more Odorous in the Hot Countreies, than in the Cold: For Moisture, wee see that Things too much Dried, lose their Sweetnesse: And Flowers growing, smell better in a Morning, or Evening, than at Noone. Some Sweet Smells are destroyed by Approach to the Fire; As Violets, Wall-Flowers, Gilly-Flowers, Pincks; And generally all Flowers that have Coole and Delicate Spirits. Some continue both on the Fire, and from the Fire, As Rose-Water, &c. Some doe scarce come forth, or at least not so pleasantly, as by means of the Fire; as Juniper, Sweet Gums, &c. And all Smells, that are Enclosed in a Fast Body: But (generally) those Smells are the most Gratefull, where the Degree of Heat is Small; Or where the Strength of the Smell is allayed; For these Things doe rather woode the Sense, than Sariate it. And therefore the Smell of Violets, and Roses exceedeth in Sweetnesse that of Spices, and Gummes; And the Strongest Sort of Smells, are best in a weft, as farre off.

It is certaine, that no Smell issueth, but with Emission of some Corporeall Substance; Nor as it is in Light, and Colours, and in Sounds. For we see plainly, that Smell doth spread nothing that distance, that the other doe. It is true, that some Woods of Oranges, and Heathes of Rose-Mary, will Smell a great way into the Sea, perhaps twenty Miles; But what is that, since a Peale of Ordnance will doe as much, which moveth in a small compasse? Whereas those Woods, and Heathes, are of Vast Spaces: Besides, we see that Smells doe adhere to Hard Bodies; As in Perfuming of Gloves, &c. which sheweth them Corporeall; And doe Last a great while, which Sounds, and Light doe not.

The Excrements of most Creatures Smell ill; Chiefly to the same Creature that voideth them: For we see, besides that of Man, that Pigeons, and Horses thrive best, if their Houses, and Stables be kept Sweet; And so of Cage-Birds: And the Cat buryeth that which she voideth: And it holdeth chiefly in those Beasts, which feed upon Flesh. Dogs (almost) onely of Beasts delight in Fetide Odours; Which sheweth there is somewhat in their Sense of Smell, differing from the Smells of other Beasts. But the Cause, why Excrements smell ill, is manifest; For that the Body it selfe rejecteth them; Much more the Spirits: And wee see, that those Excrements that are of the First Digestion, Smell the worst; As the Excrements, from the Belly: Those that are from the Second Digestion, lesse ill; As Urine; And those that are from the Third, yet lesse; For Sweat is not so bad, as the other two; Especially of some Persons, that are full of Heat. Likewise most Puerfactions are of an Odious Smell: For they smell either Fetide, or Mouldy. The Cause may bee, for that Puerfaction doth bring forth such a Consistence, as is most Contrary to the Consistence of the Body, whilest it is Sound: For it is a meere dissolution of that Forme. Besides, there is another Reason which is Profound: And it is, that the Objects that please any of the Senses, have (all) some Equalitie, and (as it were) Order in their Composition: But where those are wanting, the Object is ever Ingrate. So Mixture of many Disagreeing Colours

Experiment Solitary, touching Sweet Smells.

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Experiment Solitary, touching the Corporeall Substance of Smells.

834

Experiment Solitary, touching Fetide and Fragrant Odours.

835

is ever unpleasant to the Eye: Mixture of Discordant Sounds is unpleasant to the Ear: Mixture of Hot-Pitch of many Tastes, is unpleasant to the Taste: Hauling and Buggedness of Bodies, is unpleasant to the Touch: Now it is certain, that all Putrefaction, being a Dissolution of the first Forme, is a meere Confusion, and Unformed Mixture of the Parts. Nevertheless, it is something, and someth to Crosse the former Observation, that some Putrefaction doe yeeld excellent Odours; As Cives, and Munk; And some think Amber-Greece: For divers take it, (though unprobably,) to come from the Sperme of Fish: And the Masse weake off from Apple-Trees, is little better than an Excretion. The Reason may be, for that there passeth such Excrements, and remaineth in the Putrefaction; some good Spirits; especially where they proceed from Creatures, that are very Hot. But it may be also joynd with a further Cause, which is more Subtill; And it is, that the Sense love not to be Over-pleased; But to have a Commixture of something that is in it selfe Ingrate. Certainly, we see how Disorders in Musicke, falling upon Concorde, make the sweetest Strains: And wee see againe, what Strange Tastes delight the Taste; As Red-Herrings, Caviary, Parmizan, &c. And it may be, the same holdeth in Smells: For those kinde of Smells, that wee have mentioned, are all Strong, and doe Pull and Vellicate the Sense. And we finde also, that Places where Men Urine, commonly have some Smell of Violets: And France, if one hath eaten Nutmeg, hath so too.

The Sloathfull, Generall, and Indefinite Contemplations, and Notions, of the Elements, and their Conjugations; Of the Influences of Heaven; Of Heat, Cold, Moisture, Drought, Qualities active, Passive; and the like; have swallowed up the true Passages, and Processes, and Affections, and Consistences of Matter, and Naturall Bodies. Therefore they are to bee set aside, being but Notionall, and ill-Limited; And Definite Axiomes are to bee drawne out of Measured Instances: And so Assent to be made to the more Generall Axiomes, by Scale. And of these Kindes of Processes of Nature, and Characters of Matter, we will now set downe some Instances.

ALL Putrefactions come chiefly from the Inward Spirit of the Body; And partly also from the Ambient Body, be it Aire, Liqueur, or whatso ever else. And this last, by two Means: Either by Ingresse of the Substance of the Ambient Body, into the Body Putrified; Or by Excitation and Solicitation of the Body Putrified, and the Parts thereof, by the Body Ambient. As for the Received Opinion, that Putrefaction is caused, either by Cold, or Perpetuall and Preternaturall Heat, it is but Nugatation: For Cold in Things Inanimate, is the greatest Enemy that is to Putrefaction; though it extinguisheth the Generation, which ever consisteth in Spirit Animatus, which the Cold doth freeze and conglutinate. And as for the Perpetuall Heat, it is thus farre true; That if the Proportion of the Ambient Heat, be greatly Predominant, to the Naturall Heat and Spirit of the Body, it tendeth to Dissolution, or Notable Corruption. But this is wrought, by Evaporation, or Suppression, or Suffocation, of the Spiritus; And also by the Disruption, and Dissipation of the Parts of the Body. And other Passages of Nature, And not by a Conflict of Heats.

In

Experiment
Solitary, touching the
Cause of Putrefaction.
836

IN Versions, or Maine Alterations of Bodies, there is a Medium between the Body, as it is at first, and the Body Resulting, which Medium is Corpus imperfectum Mistum, and is Transitory, and not durable; As Mists, Smokes, Vapours, Chylus in the Stomach, Living Creatures in the first Purification: And the Middle Action, which produceth such Imperfect Bodies, is fitly called, (by some of the Ancients,) Iniquination, or Inconcoction, which is a Kinde of Putrefaction; For the Parts are in Confusion, till they settle, one way, or other.

THE word Concoction, or Digestion, is chiefly taken into use from Living Creatures, and their Organs; And from thence extended to Liquours, and Fruits, &c. Therefore they speake of Meats Concocted; Urine and Excrements Concocted; And the Four Digestions, (In the Stomach; In the Liver; In the Arteries and Nerves; And in the Severall Parts of the Body;) are likewise called Concoctions: And they are all made to be the Workes of Heat: All which Notions are but ignorant Catches of a few Things, which are most Obvious to Mens Observations. The Constantest Notion of Concoction is, that it should signifie the Degrees of Alteration, of one Body into another, from Crudity to Perfect Concoction; Which is the Vlimitie of that Action, or Processe: And while the Body to be Converted and Altered, is too strong for the Efficient, that should Convert, or Alter it, (whereby it resisteth and holdeth fast in some degree the first Forme, or Consistence,) it is (all that while,) Crude, and Inconcoct; And the Processe is to be called Cruditie and Inconcoction. It is true, that Concoction is, in great part, the Worke of Heat; But not the worke of Heat alone: For all Things, that further the Conversion, or Alteration, (as Rest, Mixture of a Body already Concocted, &c.) are also Meanes to Concoction. And there are of Concoction two Periods; The one Assimilation, or Absolute Conversion and Subaction; The other Maturation: whereof the Former is most conspicuous in the Bodies of Living Creatures; In which there is an Absolute Conversion, and Assimilation of the Nourishment into the Body: And likewise in the Bodies of Plants: And againe in Metals, where there is a full Transmutation. The other, (which is Maturation,) is seene in Liquours, and Fruits; wherein there is not desired, nor pretended, an utter Conversion, but onely an Alteration to that Forme, which is most sought, for Mans use; As in Clarifying of Drinckes; Ripening of Fruits, &c. But note, that there bee two Kindes of Absolute Conversions; The one is, when a Body is converted into another Body, which was before; As when Nourishment is turned into Flesh; That is it which we call Assimilation. The other is, when the Conversion is into a Body meere New, and which was not before; As if Silver should be turned to Gold; or Iron to Copper: And this Conversion is better called, for distinction sake, Transmutation.

THERE are also divers other Great Alterations of Matter, and Bodies, besides those that tend to Concoction, and Maturation; For whatsoever doth so alter a Body, as it returneth not againe to that it was, may be called Alteratio Major: As when Meats is Boyled, or Rosted, or Fried, &c. Or when Bread and Meats are Baked; Or when Cheese is made of Curds, or Butter of Creame, or Coales of wood, or Bricks of Earth; And a Number of others. But to apply Notions Philosophicall to Plebeian termes; Or to say, where the Notions cannot fitly be reconciled, that there wanteth a Terme, or Nomenclature for it; (as the Ancients used;) They bee but Shifts of Ignorance; For Knowledge

Experiment
Solitary, touching Bodies
Unconcoctly Mixt.
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Experiment
Solitary, touching Concoction and
Crudity.
838

Experiment
Solitary, touching Alterations, which may be called
Majors.
839

Knowledge will bee ever a *Wandering* and *Indigested Thing*, if it bee but a *Com-mixture* of a few *Things* that are at hand and occurre, and not excited from sufficient *Numbers* of Instances, and those well collated.

The *Qualities* of Bodies are very Diverse: *Dense*, *Rare*, *Tan-gible*, *Pneumaticall*, *Volatile*, *Fixed*; *Determinate*, *Not Deter-minate*, *Hard*, *Soft*, *Cleaving*, *Not Cleaving*; *Congealeable*, *Not Con-gealeable*; *Liquefiable*, *Not Liquefiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Trasile*, or to be drawne forth in length, *Intrasile*; *Porous*, *Solid*, *Equall*, and *Smooth*, *Vnequall*, *Venous*, and *Fi-vous*, and with *Graines*, *Entire*; And divers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought* is a *Compendious* and *Inutile Speculation*. But of these see princi-pally our *Abecedarium Naturæ*; And otherwise *Sparsum* in this our *Sylva Sylvarum*: Nevertheless in some good part, Wee shall handle divers of them now presently.

Liquefiable and *Not Liquefiable*, proceed from these *Causes*: *Liquefaction* is ever caused by the *Dissipation* of the *Spirits*, which play within the *Body*, and *Open* it. Therefore such Bodies, as are more *Twisted* of *Spirits*; Or that have their *Spirits* more *Straitly Imprisoned*; Or againe that hold them *Stiffer Pleasid* and *Compact*; are *Liquefiable*; for these three *Dissolutions* of *Bodies* doe men the *Emission* of the *Spirits*. An Example of the first two *Appearances* in *Metalls*; And of the last in *Grasse*, *Pitch*, *Sulphure*, *Butter*, *Waxe*, &c. The *Dissolution* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies* *leisure* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liquefiable*: As *Wood*, *Clay*, *Free Stone*, &c. But yet, even many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Softne*; As *Iron* in the *Forge*; And a *Snake* bathed in *Hot Ashes*, which thereby becommeth more *Flexible*. Whereby, there are some *Bodies*, which doe *Liquefie*, or dis-solve by *Fire*; As *Metalls*, *Waxes*, &c. And other *Bodies*, which dissolve in *Water*, As *Salt*, *Sugar*, &c. The *Cause* of the former proceedeth from the *Di-lution* of the *Spirits* by *Heat*: The *Cause* of the latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receive the *Liquour*. Again, there are some *Bodies*, that dissolve with both; As *Gumme*, &c. And those be such *Bodies*, as on the *One Side* have good store of *Spirits*; And on the other *Side*, have the *Tangible Parts* *Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the latter *Simula-teth* the *Parts* to Receive the *Liquor*.

Some *Bodies* some are *Fragile*; And some are *Tough*, and *Not Fragile*; And some are *Breaking*, some *Frangible* break but where the *Force* is; Some *Shatter* and *Shie* in many *Peeces*. Of *Fragility*, the *Cause* is an *Impotency* to bee *United*. And therefore *Stone* is more *Fragile* than *Metall*; And so *Fissile* is more *Fragile* than *Crustaceis*; And *Dry Wood* than *Greene*. And the *Want* of this *Propriety* to *Union*, is the *Small Quantity* of *Spirits*. (For *Union* is that whereby the *Transfusion* or *Dilation* of *Bodies*;) And it is *Contrary* to *Union* with *Poreis*, and with *Drinisse* in the *Tangible Parts*: Contrariwise,

Contrariwise,

Contrariwise, *Tough Bodies* have more *Spirits*, and fewer *Pores*, and *Moister Tan-gible Parts*: Therefore we see that *Parchement*, or *Leather* will *Stretch*, *Paper* will not; *Woollen Cloth* will *tenter*, *Linnen* scarcely.

ALL *Solide Bodies* consist of *Parts* of two severall *Natures*: *Pneumati-call*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Sub-stance* is in some *Bodies*, the *Native Spirit* of the *Body*; And in some other, *plaine Air* that is gotten in; As in *Bodies* despoiled, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fra-gile*: For the *Native Spirit* is more *Feeling*, and *Extensive*, (especially to follow the *Parts*;) than *Aire*. The *Native Spirits* also admit great *Diverfi-tie*; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as we call them) of *Bodies*: But the *Aire* *Intermixt*, is with-out *Vertues*, and maketh *Things* *Inspide*, and without any *Excitation*.

The *Concretion* of *Bodies* is (commonly) solved by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*; *Salt* and *Sugar*, which are *Excited* by *Heat*, are *Dissolved* by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returns* to their former *Nature*, than *Alte-rations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by *Contrary Efficients*, seemeth to be the Same; And that is, because the *Spirits* of the *Oyle*, by either *Meanes*, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it bee *Vehement*;) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them *Swell*, than *Congeale* them. As when *Ice* is congealed in a *Cup*, the *Ice* will *Swell* in *stead* of *Contracting*; And sometimes *Rise*.

OF *Bodies* some (we see) are *Hard* and some *Soft*: The *Hardness* is cau-sed (chiefly) by the *Leavenesse* of the *Spirits*; And their *Impurity* with the *Tangible Parts*: Both which if they be in a greater degree, maketh them more *Hard*, but *Fragile*, and less *Enduring* of *Pressure*. As *Steele*, *Stone*, *Glass*, *Dry Wood*, &c. *Softness* cometh (contrariwise) by the *Greater Quantity* of *Spirits*; (which ever helpeth to *Induce Feeding* and *Exfusion*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*. As in *Gold*, *Lead*, *Wax*, &c. But note, that *Softness* (as we use the word) are of two *Kinds*. The one, that easily giveth place to another *Body*, but altereth not *Bulk*, by *Rising* in other *Places*: And therefore we see that *Wax*, if you put any *Thing* into it, doth not rise in *Bulk*, but only giveth *Place*: For you may not thinke, that in *Pressing* of *Wax*, it rises up at all; But only the *Pressed Parts* giveth *Place*, and the *Other* *Parts* rise up as it was. The other that altereth *Bulk* in the *Exfusion*; As *Wax*, or *Soft Clay*, if you put a *Stone* or any *Thing* into them, they give *Place* (indeed) easily, but then they rise all over. Which is a *Fall* *Cap-sule* of it in *Place*, and *Not* *Wax*.

OF *Bodies* some are *Extensible*, and *Tensile*, (as *Wires* that will be drawne into *Wires*; *Wool* and *Tow* that will be drawne into *Yarn*, or *Thread*;) have in them the *Appetite* of *Not Discontinuing*, *Strong*; Which maketh them fol-low the *Force*, that pulleth them out; And yet so, as not *Discontinue* or forsake

Experiment Solitary, touching the Two Kinds of Pneumatics in Bodies.

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Experiment Solitary, touching Concretion, and Dissolution of Bodies.

843

Experiment Solitary, touching Hard and Soft Bodies.

844

Experiment Solitary, touching Bodies Ductile, and Tensile.

845

[illegible]

S*ugar* hath put downe the use of *Honey*; Insomuch as we have lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Bloud* issuing from the *Tree*: Insomuch as one of the *Ancients* relateth, that in *Trebison*, there was *Honey* issuing from the *Box-Trees*, which made *Men Mad*. Again, in *Ancient* time, there was a Kinde of *Honey*, which either of the owne Nature, or by *Art*, would grow as Hard as *Sugar*; And was not so Lushious as *Ours*. They had also a *Wine* of *Honey*, which they made thus. They crushed the *Honey* into a great *Quantity* of *Waier*, and then strained the *Liquour*; After they boyled it in a *Copper* to the halfe: Then they powred it into *Earthen Vessels*, for a small time; And after turned it into *Vessels* of *Wood*, and kept it for many years. They have also, at this day, in *Russia*, and those *Northerne Countries*, *Mead* Simple, which (well made, and seasoned) is a good wholesome *Drinke*, and very *Cleare*. They use also in *Wales*, a *Compound Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that we have lost in *Honey*, there were brought in use a *Sugar-Mead*, (for so we may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keep it stale, as they use *Mead*; For certainly, though it would not be so *Abstersive*, and *Opening*, and *Solutive* a *Drinke* as *Mead*; yet it will be more grateful to the *Stomach*, and more *Lenisive*, and fit to bee used in *Sharp Diseases*: For we see, that the use of *Sugar* in *Beere*, and *Ale*, hath good *Effects* in such *Cases*.

IT is reported by the *Anciens*, that there was a Kinde of *Steele*, in some places, which would polish almost as white and bright as *silver*. And that there was in *India* a Kinde of *Brasse*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; but I am doubtfull, whether Men have sufficiently refined *Metals*, which wee count *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Height? But when they come to such a Finenesse, as serveth the ordinary use, they trie no further.

THere have been found certaine *Cements* under *Earth*, that are very Soft; And yet, taken forth into the *Sunne*, harden as Hard as *Marble*: There are also ordinary *Quarries* in *Summerset-Shire*, which in the *Quarry* cut soft to any bignesse, and in the *Building* prove firme, and hard.

Living Creatures (generally) doe changetheir Haire with Age, turning to be Gray, and White: As is seene in Men, though some Earlier, some Later; In Horses, that are Dappled, and turne white; In Old Squirrels, that turne Grissy; And many Others. So doe some Birds; As Cygnets, from Gray turne white; Hawkes from Browne turne more white: And some Birds there be, that upon their Moultling, doe turne Colour; As Robin-Red-breests, after their Moultling grow to be Red againe, by degrees; So doe Gold-Finches upon the Head. The Cause is, for that Moisture doth (chiefly) colour Haire, and Feathers; And Drinesse turneth them Gray and White; Now Haire in Age waxeth Drier: So doe Feathers. As for Feathers; after Moultling, they are Young Feathers, and so all one as the Feathers of Young Birds. So the Beard is younger than the Haire of the Head, and doth (for the most part,) wax Hoare later. Out of this Ground, a Man may devise the Means of Altering the Colour of Birds, and the Retardation of Hoare-Haires. But of this see the fifth Experiments.

Experiment
Solitary, touch-
ing Honey
and Sugar.
848

Experiment
Solitary, touch-
ing the
Finer Sort of
Base Metals.
849

Experiment
Solitary, touch-
ing Comments
and Quaries.
850

Experiment
Solitary, touch-
ing the
Altering of
the Colour of
Haires and
Feathers.

Experiment
Solitary, touch-
ing the Dif-
ferences of Li-
ving Crea-
tures, Male
and Female.
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THe Difference betweene Male and Female, in some Creatures, is not to be discerned otherwise than in the Parts of Generation: As in Horses and Mares, Dogs, and Bitches, Doves He and Shee, and others. But some differ in Magnitude, and then diversely; For in most the Male is the greater; As in Man, Elephants, Parrots, Turkey; and the like; And in some few, as in Hawks, the Female. Some differ in the Haire, and Feathers, both in the Quantity, Crispation, and Colours of them; As He-Lions, are Hirsute, and have great Manes; The She's are smooth like Cais. Bulls are more Crispe upon the Face Head than Comes; The Peacock, and Pheasant-Cock, and Gold-Finch-Cock, have glorious and fine Colours; The Hen's have not. Generally, the Hees in Birds have the fairest Feathers. Some differ in divers Features; As Bucks have Hornes, Doe's none; Rammes have more wreathed Hornes than Ewes; Cocks have great Combes and Sparres. Hennes little or none. Boares have great Fangs, Sows much lesse. The Turkey-Cocks hath great and Swelling Gills, the Henne hath lesse. Men have generally Deeper and Stronger Voices than Women. Some differ in Facultie; As the Cocks amongst Singing Birds, are the best Singers. The Chiefe Cause of all these (no doubt) is, for that the Males have more Strength of Heat than the Females; Which appeareth manifestly in this, that all young Creatures Males, are like Females; And so are Eunuchs, and Gels. Creatures of all kinds, liker Females. Now Heat causeth Greatnesse of Growth, generally, where there is Moisture enough to worke upon: But if there be found in any Creature, (which is seene rarely,) an Over-great Heat in proportion to the Moisture, in them the Female is the greater; As in Hawks, and Sparrowes. And if the Heat be ballanced with the Moisture, then there is no Difference to be seene betweene Male and Female: As in the Influence of Horses and Dogs. We see also, that the Hornes of Oxen and Cows, for the most part, are Larger than the Bulls; which is caused by abundance of Moisture, which in the Hornes of the Bull faileth. Againe, Heat causeth Pilefisie, and Crispation; And so likewise Beards in Men. It also expelleth finer Moisture, which want of Heat cannot Expell; And that is the Cause of the Beanie and Varieie of Feathers: Againe, Heat doth put forth many Excrecences, and much Solide Matter, which Want of Heat cannot doe: And this is the Cause of Hornes, and of the Greatnesse of them; And of the Greatnesse of the Combes & Sparres of Cocks, Gills of Turkey-Cocks, and Fangs of Boares. Heat also dilateth the Pipes, and Organs, which causeth the Deepnesse of the Voice. Againe, Heat refresheth the Spirits, and that causeth the Cock-Singing Bird, to Excell the Hen.

THere be Fishes greater than any Beasts, As the Whale is farre greater than the Elephant. And Fishes are (generally) greater than Birds. For Fishes, the Cause may be, that because they Live not in the Aire, they have not their Moisture drawne and Soaked by the Aire, and Sunne-Beames. Also the rest alwayes in a manner, and are supported by the Water; whereas Motion and Labour do consume. As for the Greatnesse of Beasts, more than of Birds, it is caused, for that Beasts stay longer time in the Womb, than Birds; and there nourish, and grow; Whereas in Birds, after the Egge Lay'd, there is no further Growth, or Nourishment from the Female: For the Sireing doth Provide, and not Nourish.

We have partly touched before the Meanes of Producing Fruits, without Coares, or Stones. And this we adde further, that the Cause must be Abundance of Moisture; For that the Coare, and Stone are made of a Drie

Sap:

Experiment
Solitary, touch-
ing the
Comparative
Magnitude
of Living
Creatures.
853

Experiment
Solitary, touch-
ing Excre-
tion of Fruits.
854

Sap: And we see, that it is possible, to make a Tree put forth onely in Blossome, without Fruit; As in Cherries with Double Flowers; Much more, in Fruit without Stone, or Coares. It is reported, that a Cions of an Apple, grafted upon a Colewort-Stalke, sendeth forth a great Apple without a Coare. It is not unlikely, that if the Inward-Pith of a Tree, were taken out, so that the Juycce came onely by the Barke, it would worke the Effect. For it hath beene observed, that in Pollards, if the Water get in on the Top, and they become Hollow, they put forth the more. We adde also, that it is delivered for certaine by some, that if the Cions be grafted, the Small End downwards, it will make Fruit have little or no Coares, and Stones.

Tobacco is a thing of great Price, if it be in request. For an Acre of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the English Tobacco, hath small credit, as being too Dull, and Earthy: Nay the Virginian Tobacco, though that bee in a Hotter Climate, can get no credit, for the same Cause: So that a Triall to make Tobacco more Aromaticall, and better Concocted here in England, were a Thing of great profit. Some have gone about to doe it by Drenching the English Tobacco, in a Decoction or Infusion of Indian Tobacco: But those are but Sophistications, and Toyes; For Nothing that is once Perfect, and hath runne his Race, can receive much Amendment. You must ever resort to the Beginnings of Things for Melioration. The Way of Maturation of Tobacco must, as in other Plants, be, from the Heat, Either of the Earth, or of the Sunne: We see some Leading of this in Musk-Melons; which are sown upon a Hot Bed, Dunged below, upon a Banke turned upon the South Sunne, to give Heat by Reflexion; Laid upon Tiles, which increaseth the Heat; And Covered with Straw to keepe them from Cold. They remove them also, which addeth some Life: And by these Helps they become as good in England, as in Italy, or Provence. These, and the like Meanes, may be tried in Tobacco. Enquire also of the Steeping of Roots, in some such Liquour, as may give them Vigour to put forth Strong.

Heat of the Sunne, for the Maturation of Fruits; Yea and the Heat of Vivification of Living Creatures; are both represented and supplied, by the Heat of Fire; And likewise, the Heats of the Sunne, and Life; are represented one by the other. Trees, set upon the Backs of Chimneyes, doe ripen Fruit sooner. Vines, that have beene drawne in at the Window of a Kitchen, have sent forth Grapes ripe a Moneth (at least) before others. Stoves, at the Backe of Walls, bring forth Oranges here with us. Egges, as is reported by some, have beene hatched in the warmth of an Oven. It is reported by the Ancients, that the Esrich Layeth her Egges under Sand; where the Heat of the Sunne discloseth them.

Barley in the Boiling swelleth not much; Wheat swelleth more; Rize ex- tremely; In so much as a Quarter of a Pint (unboyled) will arise to a Pint boyled. The Cause (no doubt) is, for that the more Close and Compact the Body is, the more it will dilate: Now Barley is the most Hollow; Wheat more Solide than that; and Rize most Solide of all. It may bee also that some Bodies have a Kinde of Lentour, and more Deperible Nature than others; As we see it Evident in Coluration; For a Small Quantity of Saffron, will Tincture more than a very great Quantity of Bressill, or wine.

R 3

Fruit

Experiment
Solitary, touch-
ing the
Melioration of
Tobacco.
855

Experiment
Solitary, touch-
ing severall
Heats, work-
ing the same
Effects.
856

Experiment
Solitary, touch-
ing Swelling
and Dilatation
in Boiling.
857

Experiment
Solitary, touch-
ing the
Impression of
Fruit.

858

Fruit groweth Sweet by *Rawling*, or *Pressing* them gently with the *Hand*; As *Rawling* *Apples*, *Damascins*, &c. By *Rasennesse*; As *Medlars*, *Services*, *Shes*, *Hop*, &c. By *Time*; As *Apples*, *Wardens*, *Pomegranats*, &c. By certaine *Speciall Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Rawling*, *Sawing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rawling*, and *Pressing*, is *Emulsion*, which they properly endure; As in *Beating* of *Soft Fish*, *Flesh*, &c. By *Rasennesse* is, for that the *Spirits* of the *Fruit*, by *Perforation*, gather *Heat*, and thereby digest the *Harder Part*: For in all *Perforations*, there is a *Degree of Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe ever feed upon the *Tangible Parts*, and attenuate them. By *Severall Maturations* is, by some *Degree of Heat*. And by *Fire* is, because it is the *Proper Worke of Heat* to *Refine*, and to *Incorporate*; And all *Sweetnesse* consisteth in some *Grossnesse* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which ever induceth a *Milder Taste*.

Experiment
Solitary, touch-
ing *Flesh*
Edible, and
not Edible.

859

OF *Fleish*, some are *Edible*; Some, except it bee in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they have (commonly) too much *Bitternesse* of *Taste*; And therefore those *Creatures*, which are *Singe* and *Cholerick*, are not *Edible*; As *Lions*, *Wolves*, *Squirrels*, *Dogs*, *Foxes*, *Horses*, &c. As for *Kine*, *Sheep*, *Goats*, *Deere*, *Swine*, *Conneys*, *Hares*, &c. We see they are *Milde*, and *Fearfull*. Yet it is true, that *Horses*, which are *Beasts of Courage*, have beene, and are eaten by some *Nations*; As the *Sagians* were called *Hippophagi*; And the *Chineses* eat *Horse-flesh* at this day; And some *Gloumen* have used to have *Cole-flesh* baked. In *Birds*, such as the *Common Crow*, and *Birds of Prey*, are commonly no *Good Meat*; But the *Reason* is, under the *Cholerick Nature* of those *Birds*, than their *Feeding* upon *Flesh*; For *Pairs*, *Gulls*, *Shovelers*, *Ducks*, doe feed upon *Flesh*, and yet are good *Meat*: And wee see, that those *Birds*, which are of *Prey*, or feed upon *Flesh*, are good *Meat*, when they are very *Young*; As *Hawkes*, *Rakes* out of the *Nest*, *Onks*, &c. *Mans Flesh* is not *Eaten*. The *Reasons* are *Three*: First, because *Men* in *Humanity* doe abhorre it: Secondly, because no *Living Creature*, that *Dyeth* of it selfe, is good to *Eat*: And therefore the *Contrary* (as *Phenicians*) eat no *Mans Flesh*, of those that *Die of Themselfe*, but of such as are *Slaine*. The *Third* is, because there must be (generally) some *Dissimilarity* betweene the *Nourishment* and the *Body Nourished*; And they must not be *Over-nour*, or like: yet we see, that in great *Weakenesse*, and *Consumption*, *Men* have beene sustained with *Womans Milke*: And *Pierres* fondly (and conceivably) advise, for the *Prolongation of Life*, that a *Wife* bee opened in the *Side* of some wholesome *Young Man*; And the *Milk* be sucked. It is said, that *Witches* doe greedily eat *Mans Flesh*; which if it be true, besides a *Devillish Appetite* in them, it is likely to proceed, for that *Mans flesh* may send up *High and Pleasing Vapours*, which may stime the *Imagination*; And *Witches* Religion is chiefly in *Imagination*, as hath beene said.

Here is an *Ancient Tradition* of the *Salamander*, that it liveth in the *Fire*, and batheth also to extinguish the *Fire*. It must be two *Things*, if it be true in this *Opinion*: The *One* a very *Close Skin*, which is the *Middle* in the *Fire*, cannot enter: For wee see that the *Fire* is a *Thick* and *Sticky* with *Waters* of *Eggs*, and then

then *Aquaviva* bee poured upon it, and *Enflamed*, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and *Quenching vertue*, in the *Body* of that *Creature*, which choaketh the *Fire*. Wee see that *Milke* quencheth *Wilde-Fire*, better than *Water*, because it entrencheth better.

Time doth change *Fruit*, (as *Apples*, *Pearses*, *Pomegranats*, &c.) from more *Soure*, to more *Sweet*: But contrariwise *Liquours* (even those that are of the *Juyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Verjuice*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both *Kindes*, the *Spirit* is attenuated by *Time*; But in the first *Kinde*, it is more *Diffused*, and more mastered by the *Groffer Parts*, which the *Spirits* doe but digest: But in *Drinkes* the *Spirits* doe reigne, and finding lesse *Opposition* of the *Parts*, become themselves more *Strong*; Which causeth also more *Strength* in the *Liquour*; Such, as if the *Spirits* be of the *Hotter Sort*, the *Liquour* becometh apt to *Burne*; But in *Time*, it causeth likewise, when the *Higher Spirits* are *Evapourated*, more *Sournesse*.

It hath beene observed by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humiliation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtual Cold*, which doth not search into the *Hurt*; Whereas all *Plasters* and *Ointments* doe enter. Surely, the *Cause*, that *Blowes* and *Bruises* induce *Swellings*, is, for that the *Spirits* resorting to *Succour* the *Part* that *Laboureth*, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Stricken*, that causeth it; For that *Gonns*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

The *Nature* of the *Orris Root*, is almost *Singular*; For there be few *Odo-riferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: but the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a *Tender dainty Heat*, which when it cometh above *Ground*, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a *Smell* like a *Violet*.

It hath beene observed by the *Ancients*, that a great *Vessel* full, drawne into *Bottles*; And then the *Liquour* put againe into the *Vessel*, will not fill the *Vessel* again, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may bee *Triviall*; Namely, by the *Expense* of the *Liquour*, in regard some may stick to the *Sides* of the *Bottles*: But there may bee a *Cause* more *Subtill*; Which is, that the *Liquour* in the *Vessel*, is not so much *Compressed*, as in the *Bottle*. Because in the *Vessel*, the *Liquour* meeteth with *Liquour* chiefly, But in the *Bottles* a *Small Quantity* of *Liquour*, meeteth with the *Sides* of the *Bottles*, which *Compress* it so, that it doth not *Open* againe.

Water, being contiguous with *Aire*, *Cooleth* it, but *Moisteneth* it not, except it *Vapour*. The *Cause* is, for that *Heat* and *Cold* have a *Virtual Transfusion*, without *Communication* of *Substance*; but *Moisture* not: And to all *Made-fusion* there is required an *Imbibition*: But where the *Bodies* are of such *severall Levities*, and *Gravities*, as they *Mingle* not, they can follow

Experiment
Solitary, touch-
ing the
Contrary Ope-
rations of
Time, upon
Fruits, and
Liquours.

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Experiment
Solitary, touch-
ing *Blowes*
and *Bruises*.

862

Experiment
Solitary, touch-
ing the
Orris Root.

863

Experiment
Solitary, touch-
ing the
Compression of
Liquours.

864

Experiment
Solitary, touch-
ing the
working of
Water upon
Aire contiguous.

865

no Imbibition. And therefore, Oyle likewise lyeth at the Top of the Water, without Commixture: And a Drop of Water, running swiftly over a *Straw*, or *Smooth Body*, wettenh not.

Experiment
Solitary, touch-
ing the
Spirits of
Aire.

866

Starre-Light Nights, yea and bright *Moone-shine Nights*, are Colder than *Cloudy Nights*. The Cause is, the *Driness* and *Finenesse* of the *Aire*, which thereby becometh more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is drie. Also *Close Aire* is warmer than *Open Aire*, which (it may bee) is, for that the true Cause of Cold, is an *Expiration* from the *Globe* of the *Earth*, which in *open Places* is stronger; And againe, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some *Secret Degree* of *Heat*: As it is not likewise without some *Secret Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*: But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiments
in Comfort,
touching the
Eyes, and
Sight.

867

THE Eyes doe move one and the sameway; For when one *Eye* moveth to the *Nosstrill*, the other moveth from the *Nosstrill*. The Cause is *Motion of Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Use* will induce the Contrary: For some can *Squint*, when they will: And the Common Tradition is, that if *Children*, be set upon a *Table*, with a *Candle* behinde them, both *Eyes* will move Outwards; As affecting to see the *Light*, and so induce *Squinting*.

868

We see more exquisitely with *One Eye Shut*, than with *Both Open*. The Cause is, for that the *Spirits Visuall* unite themselves more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is *Open*, Dilateth.

869

The *Eyes*, if the *Sight* meet not in one *Angle*, See Things Double. The Cause is, for that Seeing two Things, and Seeing one Thing twice, worketh the same Effect: And therefore a little *Peller*, held betweene two *Fingers*, laid a croste, seemeth Double.

870

Pore-Blinde Men, see best in the *Dimmer Light*; And likewise have their *Sight* Stronger neere hand, than those that are not *Pore-blinde*; And can *Reade* and *Write* smaller Letters. The Cause is, for that the *Spirits Visuall*, in those that are *Pore-blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* disperseth them. For the same Cause they need *Contracting*; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are: As when we see thorow a *Levell*, the *Sight* is the Stronger: And so is it, when you gather the *Eye-lids* somewhat close: And it is commonly scene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to *Read*, put the *Paper* somewhat a faine off. The Cause is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blinde Men*, unite not, but when the *Object* is at some good distance, from their *Eyes*.

871

Men see better, when their *Eyes* are over-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reason is, for that the *Glares* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light* is diffused is enough for the *Perception*. For we see, that an *Over-light* maketh the *Eyes* Dazell; Inasmuch as Perpetuall Looking against the *Sunne*, maketh the Cause *Blindnesse*. Againe, if *Men* come out of a *Great Light*, into a *Dark Room*; And contrariwise, if they come out of a *Dark Room*, into a *Light*

Light Room, they seeme to have a *Mist* before their *Eyes*, and see worse than they shall doe, after they have stayed a little while, either in the *Light*, or in the *Dark*. The Cause is, for that the *Spirits Visuall*, are upon a sudden Change, disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much Dilated by *Light*, they cannot *Contract* suddenly; And when they are much *Contracted* by *Darknesse*, they cannot *Dilate* suddenly. And Excesse of both these, (that is, of the *Dilatation* and *Contraction* of the *Spirits Visuall*), if it be long, Destroyeth the *Eye*. For as long looking against the *Sunne*, or *Fire* hunteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

It hath beene observed, that in *Anger*, the *Eyes* wax Red; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The Cause is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seen in the *Eyes*, because they are Translucide; Though withall it maketh both the *Cheekes* and the *Gills* Red; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in Shame doe put back the *Spirits*, that ascend to them, as unwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Dejectedly; And that *Repulsion* from the *Eyes*, Diverteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath beene said. The *Glimpses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that have glorious Colours; The *Coming* into a *Faire Garden*; The *Coming* into a *Faire Room* richly furnished; A *Beautiful Person*; And the like, doe delight and exhilarate the *Spirits* much. The Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is most *Spirituall* of the *Senses*; whereby it hath no *Object* Grosse enough to offend it. But the Cause (chiefly) is, for that there bee no *Active Objects* to offend the *Eye*. For *Harmonical Sounds*, and *Discordant Sounds*, are both *Active*, and *Passive*: So are *Sweet Smells*, and *Stinks*: So are *Bitter* and *Sweet*, in *Taste*: So are *Over-Hot* and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore have little or no *Activity*. Somewhat they doe *Contristate*, but very little.

Water of the *Sea*, or otherwise, looketh *Blacker* when it is moved, and whiter when it resteth. The Cause is, for that by means of the *Motion*, the *Beames* of light passe not Straight, and therefore must be darkened; whereas, when it resteth, the *Beames* doe passe Straight. Besides, *Splendour* hath a *Degree of Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh whiter, than *Glasse Simple*. This Experiment deserveth to be driven further, in Trying by what Means *Motion* may hinder *Sight*.

Shell-Fish have beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they have *Male*, and *Female*, as other *Fish* have: Neither are they bred of *Putrefaction*; Especially such as doe Move. Nevertheless it is certaine, that *Oysters*, and *Cockles*, and *Muscles*, which Move not, have not discriminate Sex. Where in what time, and how they are bred: It seemeth that *Shells* of *Oysters* are bred where

Experiment
Solitary, touch-
ing the
Colour of the
Sea, or other
water.

874

Experiment
Solitary, touch-
ing Shell-
Fish.

875

none were before. And it is tried, that the great *Horse-Muscle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is strange, it hath been tried, that they doe not onely Gape and Shut, as the *Oysters* doe, but Remove from one Place to Another.

Experiment
Solitary, touch-
ing the
Right Side,
and the Left.

876

The *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limbs* on the *Right Side* are Stronger. The Cause may be, for that the *Brain* which is the Instrument of *Sense*, is alike on both *Sides*; But *Movings* and *Habitudes of Moving*, are somewhat holpen from the *Liver*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in Exercise, indifferently, on both *Sides* from the Time of our Birth; But the *Limbs* are used most on the *Right Side*, whereby *Custom* helpeth; For we see, that some are *Left Handed*: Which are such as have used the *Left Hand* most.

Experiment
Solitary, touch-
ing Frictions.

877

Frictions make the *Parts* mote *Fleshy*, and *Full*: As we see both in *Men*; And in the *Curring of Horses*, &c. The Cause is, for that they draw greater *Quantities* of *Spirits* and *Blood* to the *Parts*: And again, because they draw the *Aliment* more forcibly from within: And again, because they relax the *Poros*, and so make better *Passage* for the *Spirits*, *Blood*, and *Aliment*: Lastly, because they dissipate, and digest any *Inutile* or *Excrementitious Moisture*, which lieth in the *Flesh*: All which help *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The Cause is, for that in *Frictions*, the *Inward Parts* are at rest: Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleshy*, because they stirre the *Limbs* mote, and the *Inward Parts* lesse.

Experiment
Solitary, touch-
ing Globes
appearing
Flat at Dis-
tance.

878

All *Globes* a farre off appeare *Flat*. The Cause is, for that *Distance*, being a *secondary Object* of *Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Diffuses* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Exteriors*, if they be so farre off, as they cannot be discerned, shew but as a *Dusky Paper*: And all *Engravings*, and *Embossings*, (a farre off) appear *Plaine*.

Experiment
Solitary, touch-
ing Shad-
dows.

879

The *Visermost Parts* of *Shadows* seeme ever to *Tremble*. The Cause is, for that the little *Moats*, which we see in the *Sunne*, doe ever *Stirre*, though there be no *Wind*: And therefore those *Movings*, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to *Move*, because the *Medium* *Moveth*.

Experiment
Solitary, touch-
ing the
Rising and
Breaking of
the Sea.

880

Shallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The Cause is, for that the *Impulsion* being the same in Both; Where there is greater *Quantity* of *Water*, and likewise *Space* Enough; there the *Water* Rowleth, and *Moveth*, both more *Slowly*, and with a *Sloper Rife*, and *Fall*: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the *bottom*; there it moveth more *Swiftly*, and more in *Precipice*; For in the *Breaking of the Waves* there is ever a *Precipice*.

Experiment
Solitary, touch-
ing the
Dissolution of
Salt-water.

881

It hath beene observed by the *Ancients*, that *Salt-water* *Boyled*, or *Boyled* and *Cooled* againe, is more *Pale*, than of it selfe *Raw*: And yet the *Taste* of *Salt*, in *Dissolution* by *Fire*, is not; For the *Distilled water* will bee *Fresh*.

Fresh. The Cause may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kind of Stunne*, on the *Top*: And partly goeth into a *Sediment* in the *Bottom*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For *Simple Distilled Waters*, of *Wormewood*, and the like, are not *Bitter*.

It hath beene seen before, that *Rise* upon the *Sea-Shore*, turne into *Fresh-water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some Places of *Affricke*, after a time, the *Water* in such *Pits* will become *Dusky* againe: The Cause is, for that after a time, the very *Sand*, through which the *Salt-water* passeth, become *Salt*; And so the *Strainer* it selfe is tinted with *Salt*. The Remedy thereto is, to digge *Still New Pits*, when the old wax *Brackish*; as if you would change your *Summer*.

It hath beene observed by the *Ancients*, that *Salt-water* will dissolve *Salt* put into it, in less time, than *Fresh Water* will dissolve it. The Cause may be, for that the *Salt* in the *Precedent Water*, doth by *Similitude* of *Substance*, draw the *Salt* new put in, unto it; Whereby it dissolveth in the *Liquor* more speedily. This is a *Noble Experiment*, if it be true; For it sheweth Meanes of more *Quickness* and *Easier Infusions*; And it is likewise a good Instance of *Attraction*, by *Similitude of Substance*. Try it with *Sugar* put into *Water*, formerly *Saturated*: And into other *Waters Saturated*.

Put *Sugar* into *Wine*, part of it above, part under the *Wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* above the *Wine*, will sooner and dissolve sooner, than that within the *Wine*. The Cause is, for that the *Wine* draweth that *Part* of the *Sugar*, which is under the *Wine*, by *Simple Attraction*, or *Spreading*; But that *Part* above the *Wine*, is likewise forced by *Sinking*: For all *Spongy Bodies* expell the *Air*, and draw in *Liquors*, if it be *Contiguous* to it: we see it also in *Sponges*, put part above the *Water*. It is worthy the Inquiry, how you may make more *Assured Inferences*, by Help of *Attraction*.

*W*ater is more *Warm* in *Winter*, than in *Summer*: And so *Airs* in *Caves*. The Cause is, for that in the *Higher Parts*, under the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which heat is more in *Winter*, than in *Summer*: But if it be *Deep*, as it doth in *Summer*, it is the lesse.

It is reported, that amongst the *Levellers*, in *Affricke*, time upon a *Superstition* they did use to *Precipitate* a *Man* from a *High Cliff* into the *Sea*: Tying about him with *Strings*, so long as that a *great Fowle*; And fixing unto his *Body* divers *Feathers* (sufficient to break the *Falls*) Certainly many *Birds* of good wing, (As *Kites*, and the like,) would beare up a *good weight*, as they fly; And *Spreading* of *Feathers* thinne and close, and in *great Numbers*, will likewise beare up a *great weight*; Being even without *Tilting* upon the *Sides*. The *Order & Extent* of this *Experiment* for *Flying* may be thus upon,

Here is, in some Places, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarf-Oake*: Upon the *Leaves* whereof there riseth

Experiment
Solitary, touch-
ing the
Returne of
Saltnesse in
Pits upon the
Sea-Shore.
882

Experiment
Solitary, touch-
ing Attraction
by Similitude of Sub-
stance.
883

Experiment
Solitary, touch-
ing Attraction.
884

Experiment
Solitary, touch-
ing Heat
under Earth.
885

Experiment
Solitary, touch-
ing Flying,
in the Air.
886

Experiment
Solitary, touch-
ing the
Dye of Scarlet.
887

seth a Tumour, like a Blister; Which they gather, and rub out of it, a certaine Red-Dust, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to Quicken: With this Dust they die *Scarles*.

Experiment
Solitary, touch-
ing the *Males*
cousness.

888

IN *Zane*, it is very ordinary, to make *Men Impotent*, to accompany with their *Wives*. The like is Practised in *Gasconie*; Where it is called *Nover l'egliserre*. It is practised alwayes upon the *Wedding Day*. And in *Zane*, the Mothers themselves doe it, by way of Prevention; Because thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civill Law* taketh knowledge of; And therefore is of no Light Regard.

Experiment
Solitary, touch-
ing the Rise
of Water by
Means of
Flame.

889

It is a Common Experiment, but the Cause is mistaken. Take a *Por*, (Or better a *Glasse*, because therein you may see the *Motion*.) And set a *Candle* lighted in the Bottom of a *Bason* of *Water*; And turne the Mouth of the *Por*, or *Glasse*, over the *Candle*, and it will make the *Water* rise. They ascribe it to the *Drawing of Heat*; Which is not true: For it appeareth plainly to bee but a *Motion of Nexe*, which they call *Ne deur vacuum*. And it proceedeth thus: The *Flame* of the *Candle*, as soone as it is covered, being suffocated by the *Loss of Aire*, lessneth by little and little: During which time, there is some little Ascent of *Water*; but not much: For the *Flame* Occupying lesse and lesse Roome, as it lessneth, the *Water* succeedeth. But upon the Instant of the *Candle* going out, there is a sudden Rise, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more Place; And so the *Aire*, and the *Water* succeed. It worketh the same Effect, if, instead of *Water*, you put *Flower*, or *Sand*, into the *Bason*: Which sheweth, that it is not the *Flame* Drawing the *Liquor*, as *Noarshim*; As it is supposed; For all *Bodies* doe alike unto it: As it is ever in *Motion of Nexe*, in so much as I have seen the *Glasse*, being held by the Hand, hath lifted up the *Bason*, and all: The *Motion of Nexe* did so Clasp the Bottom of the *Bason*. That Experiment, when the *Bason* was lifted up, was made with *Oyle*, and not with *Water*: Nevertheless this is true, that at the very first Saring of the Mouth of the *Glasse*, upon the Bottom of the *Bason*, it draweth up the *Water* a little, and then standeth at a Stay, almost till the *Candle* going out, as was said. This may shew some Attraction at first: But of this we will speak more, when we handle *Aire* drawn by Heat.

Experiments
in Confort,
touching the
Influences of
the *Moone*.

888

Of the Power of the *Celestiall Bodies*, and what more Secret Influences they have, besides the two Manifest Influences of *Heat*, and *Light*, We shall speake, when we handle Experiments touching the *Celestiall Bodies*: Meane while, we will give some Directions for more certaine Trials, of the Vertue and Influences of the *Moone*; which is our Neighbour.

The Influences of the *Moone*, (most observed,) are, *Humours*: The Drawing forth of *Heat*: The Inducing of *Putrefaction*: the Increase of *Moisture*: The Exciting of the *Motions* of *Spirits*.

For the Drawing forth of *Heat*, we have formerly prescribed to take *Water Warne*, and to let Part of it against the *Moone Beames*, and Part of it with a *Skreene* betweene; And to see whether that which standeth Exposed to the *Beames*, will not *Cool* sooner. But because this is but a Small Interposition, (though in the *Sunne* we see a Small *Shade* doth much,) it were good to trie it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warne* in a *Glasse-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c.

For the Inducing of *Putrefaction*, it were good to trie it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth no, for the like time; To see whether will corrupt sooner: And trie it also with *Capon*, or some other *Fowle*, laid abroad, to see whether it will mortifie, and become tender sooner? Trie it also with *Dead Flies*, or *Dead Wormes*, having a little *Water* cast upon them, to see whether will *Putrefie* sooner. Trie it also with an *Apple*, or *Orange*, having *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Trie it also with *Holland Cheese*, having *Wine* put into it; whether will breed *Mites* sooner or greater?

For the Increase of *Moisture*, the Opinion Received is; That *Seeds* will grow soonest; And *Haire*, and *Nails*, and *Hedges*, and *Herbs*, Cut, &c. will grow soonest, if they be Set, or Cut, in the Increase of the *Moone*. Also that *Brains* in *Rabbits*, *Wood-Cocks*, *Calves*, &c. are fullest in the Full of the *Moone*: And so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you have them in *Pits*.

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) And set some of them immediately after the Change; And others of the same kinde immediately after the Full: Let them be as Like as can be: The *Earth* also the Same as neere as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the Difference of the Weather confound the Experiment: And then see in what Time, the *Seeds* Set in the Increase of the *Moone*, come to a certaine Height; And how they differ from those that are Set in the Decrease of the *Moone*.

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, upon the Full of the *Moone*: And therefore it were good for those that have *Moist Brains*, and are great *Drinkers*, to take *Fume* of *Lignum Aloes*, *Rose-Mary*, *Frankincense*, &c. about the Full of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the Full; For that then the *Humours* will not replenish so soone againe.

As for the Exciting of the *Motion* of the *Spirits*, you must note that the Growth of *Hedges*, *Herbs*, *Haire*, &c. is caused from the *Moone*, by Exciting of the *Spirits*, as well as by Increase of the *Moisture*. But for *Spirits* in particular, the great Influence is in *Lunacies*.

There may be other Secret Effects of the Influence of the *Moone*, which are not yet brought into Observation. It may be, that if it so fall out, that the Wind be North, or North-East, in the Full of the *Moone*, it increaseth Cold; And if South, or South-west, it disposeth the *Aire*, for a good while, to Warmth, and *Raine*; Which would be observed.

It may be, that *Children*, and *Young Cattell*, that are Brought forth in the Full of the *Moone*, are stronger, and larger, than those that are brought forth in the *Wane*: And those also which are Begotten in the Full of the *Moone*: So that it might be good *Husbandrie*, to put *Rammes*, and *Bulls* to their

Females, somewhat before the *Fall* of the *Moone*. It may bee also, that the *Eggs* lay'd in the *Fall* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may bee brought into *Observation*: *Quare* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Fall* of the *Moone*.

Experiment
Solitary, touch-
ing Vinegar
898

The *Turning* of *Wine* to *Vinegar*, is a Kind of *Putrefaction*: And in *Making* of *Vinegar*, they use to set *Vessels* of *Wine* over against the *Noone-Sunne*; which calleth out the more *Oylie Spirits*, and leaveth the *Liquour* more *Soure*, and *Hard*. We see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine* *Unburnt*. It is said that *Cider* in *Navigations* under the *Line* ripeneth, when *Vine* or *Beere* sowreth. It were good to set a *Rundle* of *Verjuice* over against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will *Ripen*, and *Sweeten*.

Experiment
Solitary, touch-
ing Crea-
tures that
Sleep all
Winter.

899

There be divers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hog*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and *egest* not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *VPant* of *Assimilating*; For whatsoever *Assimilates* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping-Time*, have beene observed not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remove*. And they get *VParme* and *Close Places* to *Sleep* in. When the *Flemmings* *Wintred* in *Nova Zembla*, the *Bears*, about the *Middle* of *November*, went to *Sleepe*, And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Bear* breedeth, and lyeth in with her *Young*, during that time of *Rest*: And that a *Barre*, *Big* with *Young*, hath seldome beene scene.

Experiment
Solitary, touch-
ing the
Generation of
Creatures by
Copulation,
and by Putre-
faction.

900

Some *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (neverthelesse) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Vivification*, is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Teelding Substance*: For the *Heat* doth bring forth *Spirits* in that *Substance*: And the *Substance*, being *Glutinous*, produceth *Two Effects*: The *One*, that the *Spirit* is *Detained*, and cannot *Breake forth*: The *Other*, that the *Matter* being *Gentle*, and *Teelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Smelling* into *Shops*, and *Members*. Therefore all *Sperme*, all *Menstruall Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, have evermore a *Clofenesse*, *Lemour*, and *Sequacitie*. It seemeth therefore, that the *Generation* by *Sperme* onely, and by *Putrefaction*, have two *Different Causes*. The first is, for that *Creatures*, which have a *Definite* and *Exact Shape*, (as those have which are Procreated by *Copulation*) cannot be produced by a *VPeake*, and *Casual Heat*; Not out of *Matter*, which is not *Exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vivification* bee of any length, then the *Spirits* will *Exhale*, before the *Creature* be *Maure*: Except it bee inclosed in a *Place* where it may have *Continuance* of the *Heat*, *Accesse* of some *Nourishment* to maintaine it, and *Clofenesse* that may keepe it from *Exhaling*. And such

Places

Places, or the *VPombs*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Uncertaine Shape*; And are made in *Shorter Time*; And need not so *Perfect an Enclosure*, though some *Clofenesse* be commonly required. As for the *Heathen Opinion*, which was, that upon great *Mutations* of the *VPorld*, *Perfect Creatures* were first Engendred of *Concrecion*; As well as *Frogs*, and *VPormes*, and *Flies*, and such like, are now; Wee know it to bee vaine: But if any such Thing should bee admitted, *Discourfing* according to *Sense*, it cannot be, except you admit of a *Chaos* first, and *Commixture* of *Heaven* and *Earth*.

For the *Frame* of the *VPorld* once in *Order*, cannot effect it by any *Excesse*, or *Casualty*.

NATU-



NATVRALL HISTORIE.

X. Century.



He Philosophie of Pythagoras, (which was full of Superstition,) did first plant a *Monstrous Imagination*, which afterwards was, by the Schoole of Plato, and Others, Watred, and Nourished. It was, That the *World* was *One, Entire, Perfect, Living Creature*; Insomuch as Apollonius of Tyana, a Pythagorean Prophet, affirmed, that the *Ebbing and Flowing* of the Sea, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Living Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deity* besides :) But onely the *Soule*, or *Essentiall Forme* of the *Vniuers*. This *Foundation* being laid, they mought build upon it, what they would; For in a *Living Creature*, though never so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one *Part* of the *Body*, instantly make a *Transcur* thorowout the whole *Body*: So that by this they did insinuate, that no distance of *Place*, nor *Want* or *Indisposition* of *Matter*, could hinder *Magicall Operations*; But that (for Example,) we mought herein *Europe*, have *Sense* and *Feeling* of that, which was done

Experiments in Confort, touching the Transmission, and Influx, of Immateriall Vertues, and the Force of Imagination.

in China: And likewise, we mought worke any *Effect*, without
and against *Matter*. And this, not Helpen by the *Cooperation* of
Matter, or *Forme*, but chiefly by the *Union* and *Harmony* of Na-
ture. These faims also, that find not here; but went fur-
ther abroad: That if the *Spirit* of Man, (whom they call
the *Heavenly*) ydoe give a fit reach to the *Spirit* of the *World*,
by *Strong* *Imagination* and *Beliefe*, it might command Na-
ture. For *Pythagoras* and some *Antient* *Authors* of *Magicke*,
doe ascribe to *Imagination* Exalted, the *Power* of *Miracle-work-
ing Faith*. With these Vain and Bottomlesse *Follies*, Men have
beene (in part) entertained.

But wee, that hold firme to the *Works Of God*; And to the *Sense*, which is *Gods Lamp*; (*Lux enim Dei Spirituum Hominis*;) will enquire, with all Sobriety, and Severity, whether there be to be found, in the Foot-steps of *Nature*, any such *Transmission* and *Influx* of *Immaterial Vertues*; And what the *Force* of *Imagination* is; Either upon the *Body Imaginant*, or upon another *Body*; Wherein it will be like that *Labour Of Hercules*, in Purging the *Stable Of Augeas*, to separate from *Superstitious*, and *Magickall Arts*, and *Observations*, any thing that is cleane, and pure *Natural*; And not to be either Contemned, or Condemned. And although we shall have occasion to speake of this in more Places than One, yet we will now make *some Entrance* therinto.

Men are to be Admonished, that they do, notwithstanding, from the *Operations* by *Transmission of Spirits*, and *Force of Imagination*, because the *Effects* fail *sometimes*. For as in *Infection*, and *Contagion* from *Body to Body*, (as the *Plague*, and the like,) it is most certain, that the *Infection* is received (many times) by the *Body Passive*, but yet is by the *Susceptib.* and good *Disposition* thereof, *Repelled*, and wrought out, before it be formed in a *Disease*; So much more in *Impressions* from *Minde to Minde*, or from *Spirit to Spirit*, the *Impression* taketh, but is *Encountred*, and *Overcome*, by the *Minde* and *Spirit*, which is *Passive*, before it worke any manifest *Effect*. And therefore they worke most upon *Weak Minds*, and *Spirits*: As those of *Ignorance*, *Sincke Persons*; *Superstition* and *Fearfull Persons*; *Children*, and *Young Creatures*.

Nescio quis teneros Oculus mihi fascinat Agnos:

They are speake of *Wolves*, but of *Calves*. As for the *Weakness* of the *Power* of them, upon *Wings*, and *Magick* Graces, It may be ascribed (besides the main, which is the *Providence* of *God*, over those that Execute his Place,) to the *Weakness* of the *Imagination* of the *Imaginar*: For it is hard for a *Witch*, or a *Sorcerer*, to put on a *Believe*, that they can hurt such *Persons*.

to be Admonished, on the other side, that they do not easily give Place and Credit to these Reports, because they succeed many times;

For the Cause of this Success, is (oft) to be truly ascribed, unto the Force of Affection and Imagination, upon the Body Agent; And then by a Secondary Meanes, it may worke upon a Divers Body: As for Example; if a Man carry a Planers Scale, or a Ring, or some Part of a Beast, beleiving strongly, that it will help him to obtaine his Love; Or to keep him from danger of hurt in Fight; or to prevaile in a Suit, &c. it may make him more Active, and Industrious; And againe, more Confident, and Persisting than otherwise he would be. Now the great Effects that may come of Industrie, and Perseverance, (especially in Civil Businesse,) who knoweth not? For wee see Audacity doth almost binde and mare the weaker Sort of Mindes; And the State of Humane Actions is so variable, that to trie Things oft, and never to give over, doth Wonders: Therefore it were a Meere Fallacie and Mistaking, to ascribe that to the Force of Imagination, upon another Body, which is but the Force of Imagination upon the Proper Body: For there is no doubt, but that Imagination, and Vehement Affection, worke greatly upon the Body of the Imaginant: As we shall shew in due place.

Men are to be Admonished, that as they are not to mistake the *Causes* of these *Operations*; So much lesse, they are to mistake the *Fait*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as divers wise *Judges* have prescribed, and cautioned, *Men* may not too rashly believe, the *Confessions* of *Witches*, nor yet the *Evidence* against them. For the *Witches* themselves are *Imaginative*, and believe oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the Observing, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witch*, and the Meetings of *Witches* that have beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselves into other *Bodies*; &c. are still reported to be wrought, not by *Incantations* or *Ceremonies*; But by *Ointments*, and *Annoyning* themselves all over: This may justly move a *Man* to thinke, that these *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, shut in the *Vapours*, and send them to the *Head* extremely. And for the Particular *Ingredients* of those *Magickall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annoyning* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*, wee know is used for *Procuring* *Deepe Sleeps*: And if any *Man* say, that this *Effect* would be better done by *Inward Potions*; Answer may be made, that the *Medicines*, which goe to the *Ointments*, are so strong, that if they were used inwards, they would kill those that use them: And therefore they work Potently, though Outwards.

We will divide the Severall Kindes of the *Operations*, by *Transmission of Spirits*, and *Imagination*, Which will give no small *Light* to the *Experiments* that follow. All *Operations* by *Transmission of Spirits*, and *Imagination* have this; That they *Work at Distance*, and not at *Touch*; And they are these being distinguished.

The First is the *Transmission or Emission*, of the Thinner, and more *Air* Parts of Bodies; As in Colours, and Infections; And this is, of all the rest, the most *Corporall*: But you must remember withall, that there be a Number of those Emissions, both *wholesome*, and *unwholesome*, that give no Smell at all:

For the *Plague*, many times when it is taken; giveth no *Sense* at all: And these be many *Good* and *Healthfull* *Aires*, that doe appeare by *Habitation* and other *Proofs*, that differ not in *Smell* from other *Aires*. And under this *Head*, you may place all *Inhibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some neverthelesse are strange, and very suddenly dissolved. As the *Akermia* which the *Aire* receiveth in *Egypt*, almost immediately upon the *Rising* of the *River* of *Nile*, whereof we have spoken.

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The Second is the *Transmission* or *Emission* of those *Things* that wee call *Spirituall Species*; As *Visibles*, and *Sounds*: The one whereof wee have handled; And the other wee shall handle in due place: These move swiftly, and at great distance; But then they require a *Medium* well disposed; And their *Transmission* is easily stopped.

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The Third is the *Emissions*, which cause *Attraction* of *Certaine Bodies* at *Distance*; Wherein though the *Locusts* be commonly placed in the First *Rank*, yet we thinke good to except it, and referre it to another *Head*: But the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirits* of *Quick-Silver* at distance; And the *Attraction* of *Heat* at distance; And that of *Fire* to *Naphtha*; And that of some *Herbs* to *Water*, though at distance; And divers others; Wee shall handle, but yet not under this present *Title*, but under the *Title* of *Attraction* in general.

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The Fourth is the *Emission* of *Spirits*, and *Immateriall Powers* and *Verities*, in those *Things*, which worke by the *Phisicall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influences*; (as is vainly taught and received) but by the *Primitive Nature* of *Matter*, and the *Verities* of *Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this kinde is the *Motion* of *Gnomes*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kinde we conceive the *Maine Flow* and *Reflex* of the *Sea* is, which is by *Consent* of the *Forces*, as *Part* of the *Diurnall Motion*. These *Immateriall Vertues* have this *Propertie* differing from others, That the *Diversity* of the *Medium* hindereth them not; But they passe through all *Mediums*; yet at *Determinate Distances*. And of these wee shall speake, as they are incident to severall *Titles*.

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The Fifth is the *Emissions* of *Spirits*; And this is the *Principall* in our *Intention* to handle now in this *Place*: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, upon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be *Vehement*; And the *Operation* of the *Imagination*, if it be *Strong*. But these two are so *Coupled*, as we shall handle them together; For when an *Enviom*, or *Amorous Affect*, doth infect the *Spirits* of Another, there is *Joyned* both *Affection*, and *Imagination*.

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The Sixth is, the *Influxes* of the *Heavenly Bodies*; besides those two *Manifest Ones*, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

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The Seventh is the *Operations* of *Sympathy*; Which the *Writers* of *Natural Magick* have brought into an *Art*, or *Precept*: And it is this; That if you desire to *Super-induce*, any *Vertue* or *Disposition*, upon a *Person*, you should take the *Living Creature*, in which that *Vertue* is most *Eminent*, and in *Passion*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocated*: Again, you must take those *Parts*, in the *Time*, and *Age*, when that *Vertue* is most in *Exercise*. And then you must apply it to that

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Part

Part of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would *Super-induce Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cocke* have beene in *Fight*; And let them be worne, upon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake under this present *Title*.

The Eighth and last is, an *Emission* of *Immateriall Vertues*; Such as wee are a little doubtfull to *Propound*; It is so prodigious: But that it is so constantly avouched by many: And we have set it downe, as a *Law* to our Selves, to examine things to the *Bottom*; And not to receive upon *Credit*, or reject upon *Improbabilities*, untill there hath passed a due *Examination*. This is, the *Sympathy* of *Individuals*: For as there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things* that have beene once *Contiguous*, or *Entire*, there should remain a *Transmission* of *Vertue* from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Teli*: And so of a *Pece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be *Consumed* or *Putrified*, it will worke upon the other *Part Severed*. Now we will pursue the *Instances* themselves.

911

THE *Plague* is many times taken without *Manifest Sense*, as hath beene said. And they report, that where it is found, it hath a *Sent*, of the *Smell* of a *Mellow Apple*; And (as some say) of *May Flowers*: And it is also received, that *Smells* of *Flowers* that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White-Lillies*, *Consips*, and *Hyacinths*.

The *Plague* is not easily received by such, as continually are about them, that have the *Plague*; As *Keepers* of the *Sicke*, and *Physicians*; Nor againe by such as take *Antidotes*, either *Inward*, (as *Mithridate*; *Juniper-Berries*; *Rue*, *Leafe*, and *Seed*, &c.) Or *Outward*, (as *Angelica*, *Zedoary*, and the like, in the *Mouth*; *Terre*, *Galbanum*, and the like, in *Perfume*;) Nor againe by *Old People*, and such as are of a *Drie* and *Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*.

The most *Pernicious Infection*, next the *Plague*, is the *Smell* of the *Isle*, When *Prisoners* have beene *Long*, and *Clofe*, and *Nastily* kept; Whereof we have had, in our time, *Experience*, twice or thrice; when both the *Judges* that sat upon the *Isle*, and *Numbers* of those that attended the *Businesse*, or were present, *Sickned* upon it, and *died*. Therefore it were good wisdom, that in such *Cases*, the *Isle* were *Aired*, before they be brought forth.

Out of question, if such *Foule Smells* be made by *Art*, and by the *Hand*, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Smells*, which the *Nostribs* straight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as have some similitude with *Mans Body*; And so infect themselves, and betray the *Spirits*. There may be great danger, in using such *Compositions*, in great *Meetings* of *People*, within *Houses*; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poisoning* of *Aire* is no lesse dangerous than *Poisoning* of *Water*; Which hath been used by the *Turks* in the *Warres*; And was used by *Emanuel Comnenus* towards the *Christians*, when they passed thorow his *Countrie* to the *Holy Land*. And these *Empoisonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of the

Experiments
in Confort
touching
Emission of
Spirits in Va-
pour, or Ex-
halation,
Odour-like.

912

913

914

915

the *Defilation* : And therefore, where any such thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

916

The *Empoisonment* of *Particular Persons*, by *Odours*, hath beene reported to be in *Perfumed Gloves*, or the like : And it is like, they Mingle the *Poyson* that is deadly, with some *Smells* that are Sweet, which also maketh it the sooner received. *Plagues* also have beene raised by *Annointings* of the *Chincks* of *Women*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet upon their Fingers, to put them to their *Nose*; Which *Men* therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot be made without *Danger* of *Death*, to them that make them. Burthen againe, they may have some *Antidotes* to save themselves; So that *Men* ought not to be secure of it.

917

There have beene, in divers *Countries*, great *Plagues*, by the *Purification*, of great *Swarms* of *Grasse-Hoppers*, and *Locusts*, when they have beene dead, and cast upon *Heaps*.

918

It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poisonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other *Workes* about *Metals*, and *Mineralls*, have their *Braines* Hurt and *Stupefied* by the *Metalline Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; Inasmuch as *Gilders* use to have a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Silver*; Which *Gold* afterwards they finde to be *Whitened*. There are also certaine *Lakes*, and *Fis*, such as that of *Avernus*, that *Poyson Birds*, (as is said,) which fly over them; Or *Men*, that stay too long about them.

919

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a *Closet* *Roome*, hath killed many : And it is the more dangerous, because it commeth without any *Ill Smell*; But *Smell*eth on by little and little, Enducing onely a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more *Sticks*, they fell to make *Fire* of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a *Generall Silence*, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell down in a *Swoone*; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saved themselves. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* bee made in them, Wherof no lesse *Man* than the *Emperour Iovinianus* Died.

920

Vide the *Experiment*, 803, touching the *Infectious Nature* of the *Aire*, upon the *First Showers*, after long *Drought*.

921

It hath come to passe, that some *Apothecaries*, upon *Stamping* of *Colequintida*, have beene put into a great *Skouring*, by the *Vapour* onely.

922

It hath beene a *Practice*, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirits*, that it provoketh a *Continuall Speezing*, in those that are in the *Roome*.

923

It is an *Ancient Tradition*, that *Beare-Eyes* infect *Sound Eyes*; And that a *Menstruous Woman*, looking upon a *Glasse*, doth rust it. Nay they have an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going over a *Field*, or *Garden*, doe *Corn* and *Herbs* good by *Killing* the *Wormes*.

924

The *Tradition* is no lesse *Ancient*; that the *Basiliske* killeth by *Aspe*, And that

that the *Wolfe*, if he see a *Man* first, by *Aspe* striketh a *Man* hoarse.

Perfumes Convenient doe drie and strengthen the *Brains*, And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dried, and *Lignum Aloes*, and *Calamus* taken at the *Mouth*, and *Nostrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be used in *Burning Agues*, *Consumptions*, and too much *Wakefulness*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaves* of *Vines* sprinkled with a little *Rose-Water*, &c.

They doe use in *Sudden Faintings*, and *Swoonings*, to put a *Handkerchiefe* with *Rose-Water*, Or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are upon point to resolve, and fall away.

Tobacco comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh, partly by *Opening*; But chiefly by the *Opiate Verine*, which condenseth the *Spirits*. It were good therefore to trie the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*;) of other *Things*; As well to drie, and comfort, as for other *Intentions*. I wish *Triall* bee made of the *Drying Fume*, of *Rose-Mary*, and *Lignum Aloes*, before mentioned, in *Pipe*; And so of *Nutmeg* and *Folium Indum*; &c.

The *Following* of the *Plough*, hath beene approved, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not so good; Because the *Earth* hath spent her *Sweet Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it when you sow *Barley*. But because *Ploughing* is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned up, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling upon a *Cushion*, and *Veeding*. And these *Things* you may practise in the best *Seasons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* bee too *Moist*. I knew a great *Man*, that lived Long, who had a *Clean Clod* of *Earth* brought to him every *Morning*, as hee sat in his *Bed*; And he would hold his *Head* over it, a good pretty while. I commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Vine* together, may comfort the *Spirits*, the more; Provided alwayes, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

They have, in *Physicke*, Use of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Provoking* of *Sleepe*, &c. For though those things be not so strong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*; And besides, there be divers *Things*, that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*; the *Seed* of *Melanchium*, *Ammonium*; &c.

There be two *Things*, which (inwardly used) doe *Cool* and *condense* the *Spirits*; And I wish the same to be tried outwardly in *Vapours*. The One is *Nitre*, which I would have dissolved in *Malmesey*, or *Greeke Vine*, and so the *Smell* of the *Vine* taken; Or if you would have it more forcible, poure of it upon a *Fire-pan*, well heated, as they doe *Rose-water* and *Vinegar*. The Other is the *Distilled VVater* of *VVilde Poppey*, which I wish to be mingled, at halfe, with *Rose-VVater*, and so taken with some *Mixture* of a few *Cloves*, in a *Perfuming-Pan*. The like would be done with the *Distilled VVater* of *Saffron Flowers*.

931

Smells of *Muske*, and *Amber*, and *Civet*, are thought to further *Venerous Appetite*: Which they may doe by the *Refresbing* and *calling forth* of the *Spirits*.

932

Incense, and *Nidorous Smells*, (such as were of *Sacrifices*;) were thought to *Intoxicate* the *Braine*, and to dispose *Men* to *Devotion*: Which they may doe by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. We see, that amongst the *Jewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vses*.

933

There be some *Perfumes*, prescribed by the *Writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Prophetickall Dreames*; As the *Seeds* of *Flax*, *Flea-Wort*, &c.

934

It is certaine, that *Odours* doe, in a small Degree, *Nourish*; Especially the *Odour* of *Wine*: And wee see *Men* hungred, doe love to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *woman*, in the *House*, complaine, that shee should bee kept from being at a *Feast*, and *Solemniety*, (which she much desired to see,) because there would be a *Corps* in the *House*; Whereupon he caused *Loaves* of *New Bread* to bee sent for, and opened them; And powred a little *Wine* into them; And so kept himselfe alive with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* used to have continually, a great *Wisp* of *Herbs*, that bee smelled on: And amongst those *Herbs*, some *Esculent* *Herbs* of strong *Sent*; As *Onions*, *Garlick*, *Leekes*, and the like.

935

They doe use, for the *Accidents* of the *Mother*, to burne *Feathers*, and other *Things* of ill *Odour*: And by those ill *Smells*, the *Rising* of the *Mother* is put downe.

936

There be *Aires*, which the *Physicians* advise their *Patients* to remove unto, in *Consumptions*, or upon *Recovery* of *Long Sicknesse*: Which (commonly are *Plaine Champaignes*, but *Graeing*, and not *Over-growne* with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groves* of *Bayes* doe forbid *Pestilent Aires*; Which was accounted a great *Cause* of the *Wholesome Aire* of *Antiochia*. There be also some *Soyles* that put forth *Odorous Herbs* of themselves; As *wilde Thyme*; *wilde Marjoram*; *Penny-Royall*; *Camomill*; And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discover an *Excellent Aire*.

937

It were good for *Men*, to thinke of having *Healibfull Aire*, in their *Houses*; Which will never be, if the *Roomes* be *Low-Roofed*, or full of *Windowes*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it *Exceeding Vnequall*; Which is a great *Enemy* to *Healib*. The *Windowes* also should not be high up to the *Roofe*, (which is in use for *Beautie*, and *Magnificence*;) but *Low*. Also *Stone-Walls* are not wholefome; But *Timber* is more wholefome; And especially *Brick*, Nay it hath beene used by some, with great *Success*, to make their *Walls* thick; And to put a *Lay* of *Chalke* betweene the *Bricks*, to take away all *Dampnesse*.

Experiment
Solitary, touch-
ing the
Emissions of
Spirituall Spec-
ies which
Affect the
Senses.

938

These *Emissions* (as we said before,) are handled, and ought to be handled, by themselves, under their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to give some generall *Observations*, Common to both. First, they seeme to bee *Incorporeall*. Secondly, they *Worke* *Swiftly*. Thirdly, they *Worke* at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effective* of any *Thing*; Nor leave no

V Worke

Worke behind them; But are *Energies* meerely; For their *Working* upon *Mirrors*, and *Places* of *Echo*, doth not alter any *Thing* in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windowes*, or *Rarifying* the *Aire* by *Great Noises*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *weake a Nature*, as they affect onely such a *Rare*, and *Attenuate Substance*, as is the *Spiritu* of *Living Creatures*.

It is mentioned in some *Stories*, that where *Children* have beene *Exposed*, or taken away young from their *Parents*; And that afterward they have approached to their *Parents* presence, the *Parents*, (though they have not knowne them,) have had a *Secret Joy*, or Other *Alteration* thereupon.

There was an *Egyptian Souib-Sayer*, that made *Anthonius* beleieve, that his *Genius*, (which otherwise was *Brave*; and *Confident*;) was, in the Presence of *Octavianus Caesar*, *Poore*, and *Comardly*: And therefore, he advised him, to absent himselfe, (as much as he could,) and remove farre from him. The *Souib-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Egypt*, and other *Remote Places* from *Rome*. Howsoever the *Conceit* of a *Predominant* or *Mastering Spirit* of one *Man* over Another, is *Ancient*, and Received full, even in *Vulgar Opinion*.

There are *Conceits*, that some *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to be *Sad*, and *Ill-disposed*; And contrariwise, that Others, that are of a *Ioviall Nature*, doe dispose the *Company* to be *Merry* and *Cheerfull*. And againe, that some *Men* are *Luckie* to bee kept *Company* with, and *Employed*; And others *Unluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spiritu* to *Spiritu*, when *Men* are in *Presence* one with another, as well as from *Body* to *Body*.

It hath beene observed, that *Old Men*, who have loved *Young Company*, and beene *Conversant* continually with them, have beene of *Long Life*; Their *Spirits*, (as it seemeth,) being *Recreated* by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which ever had *Young Auditours*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who lived till they were an *Hundred yeares Old*. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilus*, &c.

Audacitie and *Confidence* doth, in *Civill Businesse*, so great *Effects*, as a *Man* may (reasonably) doubt, that besides the very *Daring* and *Earnestnesse*, and *Persisting*, and *Importunitee*, there should be some *Secret Binding*, and *Swooping* of other *Mens Spirits*, to such *Persons*.

The *Affections* (no doubt) doe make the *Spirits* more *Powersfull*, and *Active*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Love*, and *Envy*, which is called *Oculus Mahis*. As for *Love*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spiritu* of the *Lover*, doth passe into the *Spirits* of the *Person Loved*; Which causeth the desire of *Returne* into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contract*, and *Conjunction*, which is in *Lovers*. And this is observed likewise, that the *Affects* that procure *Love*, are not *Ordinaries*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Envy*, that emitteeth some *Maligne* and *Poysonous Spirits*, which taketh hold of the *Spiritu* of Another; And is likewise of greatest *Force*, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most *Dangerous*, when an

Experiments
in Confort,
touching the
Emission or
Immaterial
Vertues from
the Mindes,
and Spirits of
Men, either
by Affections,
or by Imagi-
nations, or by
other Impres-
sions.

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Envious

Envious Eye is cast upon *Persons in Glory, and Triumph, and Joy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Envious Eye*, more at *Hand*: And therefore it hath bene noted, that after great *Triumphs*, *Men* have been ill disposed, for some *Dayes* following. We see the *Opinion of Fascination* is *Ancient*, for both *Effects*; Of *Procuring Love*; And *Sickness* caused by *Envy*: And *Fascination* is ever by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most *Forcibly* by the *Eye*.

Fear, and *Shame*, are likewise *Infective*; For we see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Courteousness* in a *Company*, others doe likewise *Blush* in his behalfe.

Now we will speake of the *Force* of *Imagination* upon other *Bodies*; and of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this *Place*, I understand to bee, the *Representation* of an *Individuall Thought*. *Imagination* is of three *Kindes*: The First *Joyned* with *Beleeve* of that which is to *Come*: The Second *Joyned* with *Memorie* of that which is *Past*; And the Third is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imagination Fained*, and at *Pleasure*; As if one should *Imagine* such a *Man* to bee in the *Vestments* of a *Pope*; Or to have *Wings*. I single out, for this time, that which is with *Faith*, or *Beleeve* of that which is to *Come*. The *Inquisition* of this *Subject*, in our way, (which is by *Induction*,) is wonderful hard; For the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly bee made, but with *Extreme Caution*; For the *Reason* which wee will after declare.

The *Power* of *Imagination* is in three *Kindes*; The First, upon the *Body* of the *Imaginant*; Including likewise the *Child* in the *Mothers Womb*; The Second is, the *Power* of it upon *Dead Bodies*, as *Plants, Wood, Stone, Metall, &c.* The Third is, the *Power* of it, upon the *Spirits* of *Men*, and *Living Creatures*; And with this last we will onely meddle.

The *Probleme* therefore is, whether a *Man* *Constantly* and *Strongly*, *Beleeving*, that such a *Thing* shall be; (As that such an *One* will *Leave* *His*; Or that such an *One* will *Grant* *Him* his *Request*; Or that such an *One* shall *Recover* a *Sickness*; Or the like.) It doth help any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish; For it is not *instant* (as hath bene partly said before,) that it should help by *Making* a *Man* *More Stout*, or *more Industrious*; (in which kinde a *Constant Beleeve* doth much;) But merely by a *Secret Operation*,

ration, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard (as wee began to say,) to make any *New Experiment*; For I cannot *command* my *Selfe* to *Beleeve* what I will, and so no *Triall* can be made. Nay it is worse; For whatsoever a *Man* *Imagineth* *doubtingly*, or with *Fear*, must needs doe hurt, if *Imagination* have any *Power* at all; For a *Man* representeth that oftner, that he feareth, than the contrary.

The *Help* therefore is, for a *Man* to worke by *Another*, in whom he may *Create Beleeve*, and not by *Himselfe*; untill *Himselfe* have found by *Experience*, that *Imagination* doth prevaile; For then *Experience* worketh in *Himselfe* *Beleeve*; if the *Beleeve*, that such a *Thing* shall be, be joyned with a *Beleeve*, that his *Imagination* may procure it.

For Example, I related one time to a *Man*, that was *Curious*, and *Vaine* enough in these *Things*; That I saw a kinde of *Jugler*, that had a *Paire* of *Cards*, and would tell a *Man* what *Card* he thought. This *Pretended Learned Man* told mee; It was a *Mistaking* in mee; For (said he) it was not the *Knowledge* of the *Mans Thought*, (for that is *Proper* to *God*,) but it was the *Inforcing* of a *Thought* upon him, and *Binding* his *Imagination* by a *Stronger*, that hee could *Think* no other *Card*. And thereupon he asked me a *Question*, or two, which I thought, he did but cunningly, knowing before what used to be the *Feats* of the *Jugler*. Sir, (said hee,) doe you remember whether he told the *Card*, the *Man* thought, *Himselfe*, or bade *Another* to tell it. I answered (as was true,) That he bade *Another* tell it. Whereunto he said; So I thought: For (said he) *Himselfe* could not have put on so *strong* an *Imagination*; But by telling the other the *Card*, (who beleeved that the *Jugler* was some *Strange Man*, & could doe *Strange Things*,) that other *Man* caught a *strong* *Imagination*. I hearkened unto him, thinking for a *Vaniry* he spoke prettily. Then he asked mee another *Question*: Saith he; Doe you remember, whether he had the *Man* think the *Card* first, and afterwards told the other *Man* in his *Eare*, what he should thinke; Or else that hee did whisper first in the *Mans Eare*, that should tell the *Card*, telling that such a *Man* should thinke such a *Card*, and after bade the *Man* thinke a *Card*? I told him, as was true; That he did first whisper the *Man* in the *Eare*, that such a *Man* should thinke such a *Card*: upon this the *Learned Man* did much *Exult*, and *Pleaze* himselfe, saying; Loe, you may see that my *Opinion* is *right*: For if the *Man* had thought first, his *Thought* had bene *fixed*: But the other *Imagining* first, bound his *Thought*. Which though it did somewhat sinke with mee, yet I made it *Lighter* than I thought, and said; I thought it was *Confederacy*, betwene the *Jugler*, and the two *Servants*: Though (indeed) I had no *Reason* so to thinke: For they were both my *Fathers* *Servants*; And hee had never plaid in the *House* before. The *Jugler* also did cause a *Garter* to bee held up; And tooke upon him, to know, that such an *One*, should point in such a *Place*, of the *Garter*; As it should be neare so many *Inches* to the *Longer End*, and so many to the *Shorter*; And still hee did it, by *First Telling* the *Imaginer*, and after *Bidding* the *Other* *Thinke*.

Having told this *Relation*, not for the *Weight* thereof, but because it doth handsomely open the *Nature* of the *Question*, I

returns to that I said, That *Experiments of Imagination*, must be practised by Others, and not by a *Mans Selfe*. For there be Three *Meanes* to fortifie *Beleeve*: The First is *Experience*: The Second is *Reason*: And the Third is *Authoritie*: And that of these, which is farre the most *Potent*, is *Authoritie*: For *Beleeve* upon *Reason*, or *Experience*, will Stagger.

947

For *Authority*, it is of two Kinds; *Beleeve* in an *Art*; And *Beleeve* in a *Man*. And for Things of *Beleeve* in an *Art*, A *Man* may exercise them by *Himselfe*; But for *Beleeve* in a *Man*, it must be by *Another*. Therefore, if a *Man* beleeve in *Astrologie*, and finde a *Figure* Prosperous; Or beleeve in *Naturall Magick*, and that a *Ring* with such a *Stone*, or such a *Pece* of a *Living Creature*, Carried, will doe good; It may help his *Imagination*: But the *Beleeve* in a *Man* is farre the more *True*. But howsoever, all *Authority* must be out of a *Mans Selfe*, turned (as was said,) either upon an *Art*, or upon a *Man*: And where *Authority* is from one *Man* to another, there the Second must be *Ignorant*, and not *Learned*, or *Full of Thoughts*; And such are (for the most part,) all *Witches*, and *Superstitious Persons*; Whose *Beleeves*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience*: And upon the same *Reason*, in *Magick*, they use (for the most part,) *Boyes* and *Young People*; whose *Spirits* easiliest take *Beleeve*, and *Imagination*.

Now to fortifie *Imagination*, there be three wayes: The *Authoritie* whence the *Beleeve* is derived; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refresh* it.

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For the *Authoritie*, we have already spoken: As for the Second; Namely the *Meanes* to *Quicken* and *Corroborate* the *Imagination*; We see what hath been used in *Magick*; (If there be in those *Practises* any thing that is purely *Naturall*;) As *Vestments*; *Characters*; *Words*; *Seales*; Some parts of *Plants*, or *Living Creatures*; *Stones*; *Choice* of the *House*; *Gestures* and *Motions*; Also *Incenses*, and *Oodours*; *Choice* of *Societie*, which increaseth *Imagination*; *Diet* and *Preparations* for some time before. And for *Words*, there have beene ever used, either *Barbarous Words*, of no *Sense*, lest they should disturb the *Imagination*; Or *Words* of *Similitude*, that may second and feed the *Imagination*: And this was ever as well in *Heavenly Charms*, as in *Charms* of latter *Times*. There are used also *Scripture Words*; For that the *Beleeve*, that *Religion Texts*, and *Words* have *Power*, may strengthen the *Imagination*. And for the same *Reason*, *Hebrew Words*, (which amongst us is counted the *Holy Tongue*, and the *Words* more *Mysticall*), are often used.

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For the *Refreshing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) We see the *Practises* of *Magick*, as in *Images* of *Wax*, and the like, that should Melt by little and little; Or some other *Things* Buried in *Mucke*, that should Putrifie by little and little; Or the like: For so oft as the *Imaginans* doth thinke of those *Things*, so oft doth hee represent to his *Imagination*, the *Effect* of that he desireth.

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If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Immateriall* a *Virtue*, as to worke at great *Distances*; Or through all *Mediums*; Or upon all *Bodies*: But that the *Distance* must be competent; The *Medium* not *Adverse*; And the *Body* Apt and *Proportionate*. Therefore if there be any *Operation* upon *Bodies*, in Absence by Nature;
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it is like to be conveyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, should hurt any a farre off, it cannot be naturally, but by Working upon the *Spirit* of some, that commeth to the *Witch*; And from that *Party* upon the *Imagination* of *Another*; And so upon *Another*; till it come to one that hath resort to the *Partie Intended*; And so by *Him* to the *Partie intended himselfe*. And although they speake, that it sufficeth, to take a *Point*, or a *Pece* of the *Garment*, or the *Name* of the *Partie*, or the like, yet there is lesse Credit to be given to those *Things*, except it be by Working of *evill Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, upon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare *Proofes*; For that they may be, by a *Tacite Operation* of *Maligne Spirits*: Wee shall therefore be forced in this *Enquire*, to resort to New *Experiments*: Wherein we can give onely *Directions* of *Trialls*, and not any *Positive Experiments*. And if any *Man* thinke, that we ought to have stayed, till wee had made *Experiment*, of some of them, our selves, (as we doe commonly in other *Tittles*;) the Truth is, that these *Effects* of *Imagination* upon other *Bodies*, have so little Credit with us, as wee shall trie them at leisure: But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessary, that He, by whom you worke, have a *Precedem Opinion* of you, that you can doe Strange Things; Or that you are a *Man of Art*, as they call it; For else the Simple *Affirmation* to *Another*, that this or that shall be, can worke but a weake *Impression*, in his *Imagination*.

It were good, because you cannot discern fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did use the *Imagination* of more than One; That so you may light upon a *Strong One*. As if a *Physitian* should tell Three, or Four, of his *Patients Servants*, that their *Master* shall surely recover.

The *Imagination* of One, that you shall use, (such is the *Variety* of *Mens Minds*;) cannot be alwayes alike *Constant*, and *Strong*; And if the *Successes* follow not speedily, it will faint and lesse *Strength*. To remedy this, you must pretend to Him, whose *Imagination* you use, severall *Degrees* of *Means*, by which to *Operate*; As to prescribe him, that every Three *Dayes*, if hee finde not the *Success* Apparent, he doe use another *Root*, or *Part* of a *Beast*, or *Ring*, &c. As being of more *Force*; And if that faile, *Another*; And if that, *Another*; till Seven *Times*. Also you must prescribe a good *Large Time* for the *Effect* you promise; As if you should tell a *Servant* of a *Sick Man*, that his *Master* shall recover, but it will be Fourteene *dayes*, ere he findeth it apparently, &c. All this to entertaine the *Imagination*, that it waver lesse.

It is certaine, that *Poisons*, or *Things* taken into the *Body*: *Incenses* and *Perfumes* taken at the *Nostrils*; And *Oynments* of some *Parts*; doe (naturally) worke upon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you use, if you prescribe him, before he doe use the *Receipt*, for the worke which he desireth, that he doe take such a *Pill*, or a *Spoonfull* of *Liquour*; Or burne such an *Incense*; Or Anoint his *Temples*, or the *Soles* of his *Feet*, with such an *Ointment*;

ment, or Oyle: And you must chuse, for the Composition of such Pill, Perfume, or Oyniment, such Ingredients, as doe make the Spiritus, a little more Groesse, or Muddy; Whereby the Imagination will fix the better.

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The Body Passive, and to be wrought Upon, (I meane not of the Imaginant,) is better wrought upon, (as hath beene partly touched) at some Times, than at others: as if you should prescribe a Servant, about a Sicke Person, (whom you have possessed, that his Master shall recover,) when his Master is fast asleepe, to use such a Root, or such a Root. For Imagination is like to worke better upon Sleeping Men, than Men Awake; As wee shall shew when wee handle Dreames.

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We finde in the Art of Memory, that Images Visible, worke better than other Conceits: As if you would remember the Word Philosophy, you shall more surely doe it, by Imagining, that such a Man, (For Men are best Places,) is reading upon Aristotles Physicks; Than if you should Imagine him to say; I'll goe study Philosophy. And therefore, this Observation would be translated to the Subject we now speak of: For the more Lustrous the Imagination is, it filleth and fixeth the better. And therefore I conceive, that you shall, in that Experiment, (whereof we spake before,) of Binding of Thoughts, lesse faile, if you tell One, that such an One shall name one of Twenty Men, than if it were One of Twenty Cards. The Experiment of Binding of Thoughts, would be Diversified, and tried to the Full: And you are to note, whether it hit for the most part, though not alwayes.

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It is good to consider, upon what Things, Imagination hath most Force: And the Rule, (as I conceive,) is, that it hath most Force upon Things, that have the Lightest, and Easiest Motions. And therefore above all, upon the Spiritus of Men: And in them, upon such Affections, as move Lightest; As upon Procuring of Love; Binding of Lust, which is ever with Imagination, upon Men in Feare; Or Men in Irresolution; And the like. Whatsoever is of this kinde would be thorowly enquired. Trialls likewise would be made upon Planes, and that diligently: As if you should tell a Man, that such a Tree would Dyer this yeare: And will him at these and these times, to goe unto it, to see how it thriveth. As for Inanimate Things, it is true, that the Motions of Shuffling of Cards, or Casting of Dice, are very Light Motions: And there is a Folly very usuall, that Gamblers imagine, that some that stand by them, bring them ill Luck. There would be Triall also made, of holding a Ring by a Thread in a Glasse, and telling him that holdeth it, before, that it shall strike so many times against the Side of the Glasse, and no more; Or of Holding a Key between two Mens Fingers, without a Charme; And to tell those that hold it, that at such Name, it shall goe off their Fingers: For these two are Extreme Light Motions. And howsoever I have no opinion of these things, yet so much I conceive to be true; That Strong Imagination hath more Force upon Things Living, Or that have beene Living, than Things utterly Inanimate: And more Force likewise upon Light, and Subtile Motions, than upon Motions Vchement, or Ponderous.

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It is an usuall Observation, that if the Body of One Murdered, be brought before the Murderer, the Wounds will bleed a-fresh. Some doe affirme, that the Dead Body, upon the Presence of the Murderer, hath opened the Eyes; And that there have beene such like Motions, as well where the Partie Murdered hath beene Strangled, or Drowned, as where they have beene Killed by Wounds. It may be, that this participateth of a Miracle, by Gods Just Judgement, who usually bringeth Murders to Light: But if it be Naturall, it must be referred to Imagination.

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The Tying of the Point upon the day of Marriage, to make Men Impotent towards their Wives, which (as wee have formerly touched,) is so frequent in Zant, and Gascony, if it be Naturall, must be referred to the Imagination of Him that Ties the Point. I conceive it to have the lesse Affinitie with Witchcraft, because not Peculiar Persons onely, (such as Witches are,) but any Body may doe it.

There be many Things, that worke upon the Spiritus of Man, by Secret Sympathy, and Antipathy: The Vertues of Precious Stones, worne, have beene anciently and generally Received; And curiously assigned to worke severall Effects. So much is true; That Stones have in them fine Spiritus; As appeareth by their Splendour: And therefore they may worke by Consent upon the Spiritus of Men, to Comfort, and Exhilarate them. Those that are the best, for that Effect, are the Diamond, the Emerald, the Iacinth Orientall, and the Gold-Stone, which is the Yellow Topaze. As for their particular Proprieties, there is no Credit to be given to them. But it is manifest, that Light, above all things, excelleth in Comforting the Spiritus of Men: And it is very probable, that Light Varied doth the same Effect, with more Novelty. And this is one of the Causes, why Precious Stones comfort. And therefore it were good to have Tinted Lanthornes, or Tinted Skreenes, of Glasse Coloured into Greene, Blew, Carnation, Crimson, Purple, &c. And to use them with Candles in the Night. So likewise to have Round Glasses, not onely of Glasse Coloured thorow, but with Colours laid betweene Crystals, with Handles to hold in ones Hand. Prisms are also Comfortable Things. They have of Paris-Worke, Looking-Glasses, bordered with broad Borders of small Crystal, and great Counterfeit Precious Stones, of all Colours, that are most Glorious and Pleasant to behold; Especially in the Night. The Pictures of Indian Feathers, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleare Pooles doe greatly comfort the Eyes, and Spiritus; Especially when the Sunne is not Glaring, but Overcast; Or when the Moone shineth.

There be divers Sorts of Bracelets fit to Comfort the Spiritus; And they be of Three Intentions: Refrigerant; Corroborant; and Aperient. For Refrigerant, I wish them to be of Peale, or of Corall, as is used: And it hath beene noted that Corall, if the Party that weareth it be ill disposed, will wax Pale: Which I beleeve to be true, because otherwise distemper of Heart will make Corall lose Colour. I commend also Beads, or little Plates of Lapis Lazuli; And Beads of Nitre, either alone, or with some Cordiall Mixture.

For Corroboration & Comfortation, take such Bodies as are of Astringent Quality, without Manifest Cold. I commend Bead-Amber, which is full of Astringent, but yet is Vntinuous, and not Cold; And is conceived to Impinguate those that weare such Beads: I commend also Beads of Haris-Horne, and Ivory, which are of the like Nature; Also Orange-Beads; Also Beads of Lignum A-lbes, Macerated first in Rose-Water, and Dried.

For Opening, I commend Beads, or Peecces of the Roots of Carduus Benedictus: Also of the Roots of Piony the Male; And of Orris; And of Calamus Aromaticus; And of Rew.

The Cramp, (no doubt) cometh of Contraction of Sinewes; Which is Manifest, in that it cometh either by Cold, or Drinesse; As after Consumptions, and Long Agues; For Cold and Drinesse doe (both of them) Contract, and Corrugate. Wee see also, that Chafing a little above the Place in paine, easeth the Cramp; Which is wrought by the Dilatation, of the Contracted Sinewes, by Heat. There are in use, for the Prevention of the Cramp, two Things;

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Experiments
in Comfort,
touching the
Secret Vertue
of Sympathy,
and Antipathy
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The one Rings of Sea-Horse Teeth, worne upon the Fingers; The other Bands of Greene Periwinkle, (the Herb,) tied about the Calfs of the Leg, or the Thigh, &c. where the Cramp useth to come. I doe finde this the more strange, because Neither of these have any Relaxing Verue, but rather the Contrary. I judge therefore, that their Working is rather upon the Spirits, within the Nerves, to make them strive lesse; Than upon the Bodily Substance of the Nerves.

I would have Triall made of two other Kindes of Bracelets, for Comforting the Heart, and Spirits; The one of the Trochisch of Vipers, made into little Peeces of Beads; For since they doe great Good Inwards, (especially for Pefilent Agues,) it is like they will be Effectuall Outwards; Where they may be applied in greater Quantity. There would bee Trochisch likewise made of Snakes; Whose Flesh dried, is thought to have a very Opening, and Cordiall Verue. The other is, of Beads made of the Scarlet Powder, which they call Kermes; Which is the Principall Ingredient in their Cordiall Confection Alkermes: The Beads would bee made up with Amber-Grice, and some Pomander.

It hath beene long received, and confirmed by divers Trialls; That the Root of the Male-Piony, dried, tied to the Necke, doth help the Falling-Sicknesse; And likewise the Incubus, which we call the Mare. The Cause of both these Diseases, and especially of the Epilepsie from the Stomach, is the Grossnesse of the Vapours, which rise and enter into the Cells of the Braine: And therefore the Working is, by Extreme, and Subtill Attenuation; Which that Simple hath. I judge the like to bee in Castoreum, Muske, Rev-Seed, Agnus Castus Seed, &c.

There is a Stone, which they call the Bloud-Stone, which worne is thought to be good for them that Bleed at the Nose: Which (no doubt) is by Astringion, and Cooling, of the Spirits. Quare, if the Stone taken out of the Toads Head, be not of the like Verue, For the Toad loveth Shade, and Coolenesse.

Light may be taken from the Experiment of the Horse-Tooth-Ring, and the Spoile of Periwinkle, how that those things, which allswage the Sirife of the Spirits, do help diseases, contrary to the Intention desired: for in the Curing of the Cramp, the Intention is, to relax the Sinewes; But the Contraction of the Spirits, that they strive lesse, is the best Help: So to procure easie Travailes of Women, the Intention is to bring down the Childe, But the best Help is, to stay the Coming down too Fast: Whereunto they say, the Toad-Stone likewise helpeth. So in Pestilant Fevers, the Intention is to expell the Infection by Sweats, and Evaporation; But the best Meanes to doe it, is by Nitre, Discordium, and other Coole Things, which doe for a time arrest the Expulsion, till Nature can doe it more quietly. For as one saith prettily; In the Quenching of the Flame of a Pestilant Ague, Nature is like People that come to quench the Fire of a House, which are so busie, as one of them leteeth another. Surely, it is an Excellent Axiome, and of Manifold Use; that whatsoever appeaseth the Contentions of the Spirits, furthereth their Action.

The Writers of Naturall Magick commend the Wearing of the Spoile of a Snake, for Preserving of Health. I doubt it is but a Conceit; For that the Snake is thought to renew her Youth, by Casting her Spoile. They might as well take the Beake of an Eagle, or a Peeces of a Haris-Horne, because those Renewe.

It hath beene Anciently Received, (For Pericles the Athenian used it,) and it is yet in use, to wear little Bladders of Quick-Silver, or Tablets of Arsenick, as Preservatives against the Plague: Not as they conceive, for any Comfort they yeeld to the Spirits; but for that being Poisons themselves, they draw the Venome to them, from the Spirits. *Vide*

Use the Experiments 95. 96. and 97. touching the Severall Sympathies, and Antipathies, for Medicinall Use.

It is said, that the Guts or Skin of a Wolfe being applyed to the Belly, doe cure the Cholicke. It is true, that the Wolfe is a Beast of great Education and Digestion; And so, it may be, the Parts of him comfort the Bowels.

We see Scare-Crowes, are set up to keep Birds from Corne, and Fruit; It is reported by some, that the Head of a Wolfe, whole, dried, and hanged up in a Dove-House, will scare away Vermine; Such as are Weasels, Polcats, and the like. It may be, the Head of a Dog will doe as much; For those Vermine with us, know Dogs better than Wolves.

The Braines of some Creatures, (when their Heads are roasted) taken in Wine, are said to strengthen the Memory: As the Braines of Hares; Braines of Hens; Braines of Deeres, &c. And it seemeth to bee incident to the Braines of those Creatures, that are Fearfull.

The Ointment, that Witches use, is reported to be made, of the Fat of Children, digged out of their Graves; Of the Iuyces of Smallage, Wolfe-Bane, and Cinquefoile; Mingled with the Meale of fine Wheat. But I suppose, that the Soporiferous Medicines are likest to doe it; Which are Henbane, Hemlocke, Mandrake, Moon-Shade, Tobacco, Opium, Saffron, Poplar-Leaves, &c.

It is reported by some, that the Affections of Beasts, when they are in Strength, doe adde some Verue, unto Inanimate Things; As that the Skin of a Sheep, devoured by a Wolfe, moveth Licking; That a Stone bitten by a Dog in Anger, being throwne at him, drunke in Powder, provoketh Choler.

It hath beene observed, that the Diet of Women with Childe, doth worke much upon the Infant; As if the Mother eate Quinces much, and Coriander-Seed, (the Nature of both which is to repress and stay Vapours, that ascend to the Braine,) it will make the Childe Ingenious: And on the contrarie side, if the Mother eat (much) Onions, or Beanes, or such Vaporous Food; Or drinke Wine, or Strong Drinke, immoderately; Or Fast much; Or bee given to much Musing; (All which tend, or draw Vapours to the Head,) It endangereth the Childe to become Lunaticke, or of Imperfect Memory: And I make the same Judgement of Tobacco, often taken by the Mother.

The Writers of Naturall Magick report, that the Heart of an Ape, worne neare the Heart, comforteth the Heart, and increaseth Audacity. It is true, that the Ape is a Merry and Bold Beast. And that the same Heart likewise of an Ape applyed to the Necke, or Head, helpeth the Wit; And is good for the Falling-Sicknesse: The Ape also is a Witty Beast, and hath a Drie Braine; Which maybe some Cause of Attenuation of Vapours in the Head. Yet it is said to move Dreames also. It may be the Heart of a Man would doe more, but that it is more against Mens mindes to use it; Except it bee in such as wear the Reliques of Saints.

The Flesh of a Hedge-Hog, Dressed, and Eaten, is said to be a great Drier: It is true, that the Iuyce of a Hedge Hog, must needs bee Harsh, and Drie, because it putteth forth so many Prickles: For Plants also, that are full of Prickles, are generally Dry: As Briars, Thornes, Berberries: And therefore the Ashes of an Hedge-Hog are said to be a great Desiccative of Fistulas.

Mummy hath great force in Stanching of Bloud; which, as it may be ascribed to the Mixture of Balmes, that are Glutinous, So it may also partake of a Secret Propriette; In that the Bloud draweth Mans Flesh. And it is approved, that the Masse, which groweth upon the Skull of a Dead Man, unburied, will stanch Bloud Potently. And so doe the Dregs, or Powder of Bloud, severed from the Water, and Dried.

It hath beene practised to make *White Swallows*, by *Anaiming* of the Eggs with Oyle. Which Effect may be produced, by the *Sopping* of the Pores of the Eggs, and making the Oyle, that putteth forth the Feathers afterwards, more Penetrable. And this may be, the *Anaiming* of the Egg, will be as Effectually, as the *Anaiming* of the Body, Of which *Vide* the Experiment 93.

21 It is reported, that the *White* of an Eye, or *Blind*, mingled with *Salt-Water*, doth *Clarify* the *Salt*, and maketh the *Water* sweeter. This may be by *Adulteration*, as in the 6. Experiment of *Clarification*. It may be also, that *Blind*, and *White* of an Eye, (which is the *Matter* of a *Living Creature*,) have some *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. Wee see *Salt* draweth *Water* out of a *Cucumber*, beate[n] it; So as it seemeth *Salt* draweth *Blind* out of the *Eye*, and draweth *Salt*.

22 It hath beene anciently received, that the *Sea Hare*, hath an *Antipathy* with the *Leggs*, (if it commeth neare the *Body*;) and exodeth them. Whereof the *Sea Hare* is also received to be a *Qualitie* hath of *Heating* the *Breath* and *Spirits*. As *Cambyses* have upon the *White* Parts of the *Body*; As *Urine* and *Synoviall* humors. And it is a good Rule, that whatsoever hath an *Operation* upon certain *Members* of *Matters*, that in *Man* *Body*, worketh most upon those *Parts* wherein that *Kind* of *Matter* aboundeth.

23 It hath beene received, that *Concealed* with *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the *Same* *Thing*, when it is *Alive*, and when it is *Sound*; And with those *Things* which doe *Extern*: As a *Canker* of *Man* is most *Infectious*, and *Odious* to *Man*; A *Curie* of an *Horse* to an *Horse*; Sec. *Parasiticall* *Matter* of *Wounds*, and *Scabs*, *Cancers*, *Pocks*, *Scabs*, *Leprosie*, to *Sound* *Flesh*; And the *Exhalation* of *Dead* *Species* to that *Creature* that *Extern*eth them. But the *Exhalation* of *Dead* *Species* is more *Powerfull* than the *Corruptions*.

24 It is a Common Experiment, that *Dogs* know the *Dog-Killer*: When as *Idiot* of *Antiquity*, some *Perry* *Fellow* is sent out to kill the *Dogs*; And though they have never seen him before, yet they will all come forth, and bite, and die at him.

25 It is also touching the *Force* of *Imagination*, and the *Secret* *Instincts* of *Nature*, are so uncertaine, as they require a great deale of *Examination*, ere we can conclude upon them. I would have it first thorowly inquired, whether there be any *Secret* *Passages* of *Sympathy*, between *Persons* of *neare* *Blond*: As *Parents*, *Children*, *Brothers*, *Sisters*, *Wives*, *Children*, *Handmaids*, *Wives*, &c. There be many Reports in *History*, that upon the *Death* of *Persons* of such *Neareness*, they have had an inward *Feeling* of it. I my self remember, that being in *Italy*, and my *Father* dying in *London* two or three dayes before my *Fathers* death, I had a *Dark*, which I told to divers *English* *Gentlemen*; That my *Father* that, in the *Country*, was *Plastered* all over with *Blacke* *Mortar*. There is an *Opinion* abroad, (whether idle or no I cannot say,) That loving *Antiquaries* have a *Sense* of their *Wives* *breeding* *Child*, by some *Accident* in their *owne* *Bodies* soon after.

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being in farre *Distant* *Places*, should *Pray* one for Another, Or should put on a *Ring*, or *Tablet*, one for anothers *Sake*; Whether if one of them should breake their *Vow* and *Promise*, the other should have any *Feeling* of it, in *Absence*.

If there be any *Force* in *Imaginations* and *Affections* of *Singular* *Persons*; It is Probable the *Force* is much more in the *Joynt* *Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost, in *Remote* *Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth; Because of the great *Joy*, or *Griefe*, that many *Men* are posselt with at once? *Pompey*, at the very time, when that *Memorable* *Victory* was won, by the *Christians*, against the *Turkes*, at the *Navall* *Battel* of *Lepanto*, being then hearing of *Causes* in *Consistory*, brake off suddenly, and said to those about him, It is now more time we should give thanks to *God*, for the great *Victory* he hath granted us, against the *Turks*; It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was merely his *Worke*, to conclude that *League*. It may be, that *Revelation* was *Divine*; But what shall we say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Plays*, have had *Newes* of *Victories*, and *Overthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these *Things*, which is the generall *Root* of *Superstition*: Namely, that *Men* observe when *Things* *Hit*, and not when they *Miss*: And commit to *Memoirie* the one, and forget and passe over the other. But touching *Divination*, and the *Misgiving* of *Mindes*, we shall speake more, when we handle in generall the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

We have given formerly some *Rules* of *Imagination*; And touching the *Fertifying* of the Same. We have set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, upon *Beasts*, *Birds*, &c. upon *Plants*; And upon *Inanimate* *Bodies*: Wherein you must still observe, that your *Trials* be upon *Subtile* and *Light* *Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*. And I leave it to every *Man*, to choose *Experiments*, which himselfe thinketh most *Commodious*; Giving now but a few *Examples* of every of the *Three* *Kindes*.

1. If some *Imagination*, (observing the *Rules*, formerly prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trye also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Catch* *Fights*, to make one *Cocke* more *Hardy*, and the other more *Comardly*. It would be tried also, in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hart*, with *Grey* *Hounds*; Or in *Horse* *Races*; And the like *Comparative* *Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it. As it is easier to make a *Dogge* goe slower, than to make him stand still that homely not runne.

2. In *Plants* also, you may tie the *Force* of *Imagination*, upon the *Lighter* *Sorts* of *Motions*: As upon the *Sudden* *Fading*, or *Lively* *Coming* up of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Closing*, and *Opening*; &c.

3. For *Inanimate* *Things*, you may tie the *Force* of *Imagination*, upon *Staying* the

the *working* of Beere, when the *Barme* is put in; Or upon the *Comming* of Water, or Cheese, after the *Churning*, or the *Renner* be put in. It is an *Antient Tradition*, even where alleged; for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long *Sticke*, doth suprise the *Hand* of him that toucheth it. It is one degree of *working at Distance*, to work by the Continuance of a *Rit Medium*; As *Sound* will be conveyed to the *Eare*, by striking upon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

The *Writers* of *Naturall Magick*, doe attribute much to the *Verines*, that come from the *Parts* of *Living Creatures*; So as they be taken from them, the *Creatures* remaining still alive: As if the *Creature* still living did infuse some *Immortal Vertue*, and *Vigor* into the *Part Severed*. So much may be true; that any *Part*, taken from a *Living Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, dying of it *Selfe*, because it is fuller of *Spirits*.

Triall would be made, of the like *Parts* of *Individualls*, in *Plants*, and *Living Creatures*; As to cut off a *Stock* of a *Tree*; And to lay that, which you cut off, to *Purifie*, to see whether it will Decay the Rest of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*, or a *Cat*, and lay it to *Purifie*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

It is received, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bracelet* of the *Haire* of the *Party Beloved*: But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Favour*, may as well doe it.

The *Sympathie* of *Individualls*, that have beene *Enured*, or have *Touched*, is of all others the most *Incredible*: Yet according unto our faithfull *Manner* of *Examination* of *Nature*, we will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waste, and consume, is a *Common Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had from my *Childhood*, a *Wart* upon one of my *Fingers*: Afterwards when I was about Sixteen *Years* old, being then at *Paris*, there grew upon both my *Hands* a *Number* of *Warts*, (at the least an hundred, in a *Months* space. The *English Embassadors Lady*, who was a *Woman* full from *Superstition*, told me, one day; She would helpe me away with my *Warts*: Whereupon she got a *Piece* of *Lard* with the *Skin* on, and rubbed the *Warts* all over with the *Fat Side*: And amongst the rest, that *Wart* which I had had from my *Childhood*; Then shee nailed the *Piece* of *Lard*, with the *Fat* towards the *Wart*, upon a *Pease* of her *Chamber window*, which was to the *South*. The *Success* was, that within five *Weekes* space, all the *Warts* went quite away: And that *Wart*, which I had so long endured for *Company*. But at the rest I did little marvell, because they came in a *Short* time, and might goe away in a *Short* Time againe: But the *Going away* of that, which had lasted so long, doth yet stick with me. They say the like is done by the *Rubbing* of *Warts* with a *Green Elder Sticke*; and then *Binding* the *Sticke* to the *Wart* in *Muck*. It would be tried, with *Gumme*, and *Woad*, and such other *Excrefcences*. I would have it also tried, with some *Parts* of *Living Creatures*, that are nearest the *Nature* of *Excrefcences*; As the *Cobbs* of *Cocks*, the *Spruces* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would have it tried both ways; Both by *Rubbing* those *Parts* with *Lard*, or *Elder*, as before, and by *Causing* of some *Piece* of those *Parts*, and laying it to *Consume*. To see whether it will *Work* any *Effect*, towards the *Consumption* of that *Part*, which was once *Torned* with it.

It is constantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, upon the Relation of *Men of Credit*, (though my selfe, as yet, am not fully inclined to beleave it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of *Divers Ingredients*, whereof the *Strangest* and *Hardest* to come by, are the *Mosse* upon the *Skull* of a dead *Man*, *Unburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Age* of *Generation*. These two last I could easily suspect to be prescribed as a *Starting Hole*; That if the *Experiment* proved not, it might be pretended, that the *Beasts* were not killed in the due *Time*; For as for the *Mosse*, it is certain, there is great *Quantity* of it in *Ireland*, upon *Slaine Bodies*, laid on *Heaps*, *Unburied*. The other *Ingredients* are, the *Bloud-Stone* in *Powder*, and some other *Things*, which seeme to have a *Vertue* to *Stanch Blood*; As also the *Mosse* hath. And the *Description* of the whole *Ointment* is to be found in *Chymicall Dispensatorie* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but only applied to the *Weapon*. Thirdly, (which I like well) they doe not observe the *Confessing* of the *Ointment*, under any certaine *Constellation*; which commonly is the *Excuse* of *Magical Medicines*, when they faile, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the *Partie*, to be *Cured*, is not needfull to *Concurre*; For it may be done, without the *Knowledge* of the *Partie Wounded*: And thus much hath been tried, that the *Ointment* (for *Experiments* sake,) hath been wiped off the *Weapon*, without the *Knowledge* of the *Partie Hurt*, and presently the *Partie Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Annoining* of that *Instrument* will serve, and worke the *Effect*. This I doubt should be a *Device*, to keepe this strange *Forme* of *Cure*, in *Request*, and *Use*; Because many times you cannot come by the *Weapon* it selfe. Seventhly, the *Wound* must be at first *Washed* cleane, with *White Wine*, or the *Parties owne Water*; And then bound up close in *Fine Linnen*, and no more *Dressing* renewed, till it be whole. Eighthly, the *Sword* it selfe must be *Wrapped up Close*, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you wipe it off from the *Sword*, and keepe it, will *Serve* againe; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *shorter Time*, than *Ointment* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*; which I like best of all the rest, because it subjecteth the *Manner*, to an *Easie Triall*.

I Would have *Men* know, that though I reprehend, the *Easie Passing over*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not understand, but that in the *Practical Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be *Cooling*; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receive from *Experience*, that *Powder* of *Chamaepitys*,

Experiment
Solitary, touch-
ing Secret
Proprieties.
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or the like, drunke in *Aere*, is good for the *Jaundies*: So againe, a wife *Physician* doth not continue still the same *Medicine*, to a *Patient*; But he will vary, if the first *Medicine* doth not apparently succeed: For of those *Remedies* that are good for the *Jaundies*, *Stone*, *Agues*, &c. that will doe good in one *Body*, which will not do good in another; According to the Correspondence the *Medicine* hath to the *Individuall body*.

The *Delight* which *Men* have in *Popularitie*, *Fame*, *Honour*, *Submission*, and *Subjection* of other *Mens Mindes*, *Will*, or *Affections* (although these *Things* may be desired for other *Ends*,) seemeth to be a *Thing*, in it selfe, without Contemplation of Consequence, Gratefull and agreeable to the *Nature* of *Man*. This *Thing* (surely) is not without some Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Divine Limbus*. Else why men be so much affected with that, which others thinke, or say? The best Temper of *Mindes* desireth *Good Name*, and *True Honour*: The *Lighter*, *Popularitie*, and *Applause*; The more depraved: *Subjection*, and *Tyranny*; As is seen in great *Conquerours*, and *Troublers of the World*: And yet more in *Arch-Hereticke*s; for the Introducing of new *Doctrines*, is likewise an *Affection* of *Tyranny*, over the *Understandings*, and *Beliefes* of *Men*.

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As Table of the Chief Matters

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FINIS.



His Lo^{ps}. Vsuall Receipt for the Gout, to which
the Sixtieth Experiment hath reference, was this.

To be taken in this Order.

1. The Pultaffe.

R. Of Manchett, about 3. Ounces, the Crumme onely, thin cut ; Let it bee
boyled in Milk, till it grow to a Pulp. Adde, in the end, a Dramme, and
an halfe, of the powder of Red Roses.
Of Saffron 10. Graines.
Of Oyle of Roses an Ounce.
Let it be spread upon a Linnen Cloth, and applied luke-warme ; And
continued for three Houres space.

2. The Bath, or Fomentation.

R. Of Sage- Leayes, halfe a handfull.
Of the Root of Hemlock, Sliced, 6. Drams.
Of Briony Roots, halfe an Ounce.
Of the Leayes of Red Roses, 2. Pagills.
Let them be boyled in a pottle of Water, wherein Steele hath beene
quenched, till the Liqueur come to a quart. After the Straining, put
in halfe a handfull of Bay-Salt.
Let it be used, with Scarlet Cloth or Scarlet Wooll, dipped in the Li-
quour, hot, and so renewed seven times ; All in the space of a quarter
of an Houre, or little more.

3. The Plaster.

R. Emplastrum Diacalciteos, as much as is sufficient, for the part you
meane to cover. Let it be dissolved with Oyle of Roses, in such a Con-
sistence, as will sticke ; And spread upon a peece of Eloffand, and applied.